



Defense

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Acquisition, Technology and Logistics

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Becoming a “Chaosmeister”



Tying Profit to Performance

A Valuable Tool, But Use With Good Judgment
by the Under Secretary of Defense for Acquisition, Technology, and Logistics

Performance-Based Logistics

A Readiness Strategy Tailor Made for Austere Times

Source Selection Simulation

Intact Team Training on Picking a Provider

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Under Secretary of Defense for Acquisition, Technology and Logistics
Frank Kendall

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Tying Profit to Performance

A Valuable Tool, But Use With Good Judgment

Frank Kendall



One thing I enjoyed about working in industry was that everyone in the private sector understood the definition of success: It was profit. If something made a profit for a business, it was good. If something did not make a profit for a business, then it was not good. Profit is the fundamental reason that businesses exist: to make money for their owners or shareholders. Without profit, businesses die.

From industry's point of view, more profit is always better. Not being profitable makes a company unsustainable and will lead to bankruptcy. Declining profits make it harder for businesses to raise capital or to invest for their futures. These facts make profit the most powerful tool the Department of Defense (DoD) has to obtain better performance from industry. It is important, however, to recognize that this also implies that over-aggressive use of this tool can seriously damage the institutions we depend upon for products and services.

Sometimes—through some combination of incompetence, poor management, the realization of risk, or external factors—defense companies will lose money and even go out of business. That is the nature of capitalism. We do not have an obligation to protect defense companies from themselves, but we do have an obligation to treat them fairly and to try to balance our use of profit as a motivator for better performance with an understanding of the possible implications for those we expect and hope to do business with over the long term.

As we continue to work through a period of uncertain and declining budgets, we need to be especially careful. A recent study by the Institute for Defense Analyses shows very clearly that cost increases correlate strongly with tight budgets. Historically, programs initiated during tight budget periods had 3 times higher acquisition cost growth for production than those started during less constrained resource periods. We're working now to understand what causes this strong correlation, but one likely factor is that tight money motivates everyone to take more risk. A shrinking market and fewer bidding opportunities put pressure on industry to bid more aggressively. Government

budgeters and programmers are motivated to take risk also, or to buy into optimistic assumptions or speculative management fads as alternatives to having to kill needed programs. Industry may be incentivized to sign up for a low target—knowing that they might otherwise be out of that market permanently—and hoping that budget instability and/or changing requirements will provide a recovery opportunity. We can't entirely prevent industry from making high-risk bids in competition, but we should do what we can to ensure realism in our budgets and executable business arrangements that give industry a fair opportunity to make a reasonable profit.

The profit margins that DoD pays vary, but in the aggregate they are fairly stable. Large defense companies, in particular, have very little risk. Their markets are fairly predictable and stable. The government pays upfront for most product research and development costs, and provides excellent cash flow through progress payments, minimizing the cost of capital. Most development programs are also cost reimbursable, which significantly limits the risk to industry. Substantial barriers for new companies to enter the defense market also limit competitive risks. While there usually is competition early in product life cycles, many products end up as sole-source awards by the time they enter production. The primary defense market customer, DoD, is highly regulated, is not allowed to arbitrarily award contracts, and is subject to independent legal review if a bidder believes it has not been treated fairly. At the end of the day, it's not a bad business to be in, and we don't want to change these fundamental premises of government contracting. We do, however, want to get as much for the taxpayer and the warfighter as we can with the available resources. That means we must tie performance to profitability.

As we have tried to incentivize and improve industry's performance under the Better Buying Power (BBP) initiatives of the last several years, we have consistently followed two principles. First, BBP is not a "war on profit"—we are not trying to reduce profit as a way to reduce costs. We want to continue to give our industry suppliers a reasonable return. Second, we will use profit to motivate better performance, both as a carrot and a stick. In the balance of this article, I want to focus on this second principle.

How do we use profit effectively to obtain better results for the taxpayer and the warfighter? I'm going to address some specific cases I think are important: product development, early production, lowest price technically acceptable, commercial and commercial-like items, logistic support, and support services.

First, I would like to address the use of profit as an incentive in general. Before we solicit anything from industry, we need

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to think carefully about what the government really needs or desires and how we can effectively tie getting what we need to profit opportunities for industry. In product acquisitions, we need to decide whether higher performance or cost or schedule or some combination of these parameters matters to us. Often they are not independent, and we have to think about how those interdependencies are related to profit-related incentives. In services acquisitions, we often want a certain quality of performance; we may or may not be willing to pay more for higher-quality performance of the service, or we may only be interested in controlling cost at a set level of performance. As we emphasized in BBP 2.0, we have to start by thinking, in this case thinking carefully about what matters to us and about the extent to which fee or incentive structures can add motivation to behavior that achieves those government objectives and that wouldn't exist without the incentives.

We can use the full range of contract types to motivate performance. For products, we sometimes place the highest value on the schedule, sometimes on the cost, and sometimes on increased performance levels. Our contracts often inherently include a high degree of profit motivation without any special incentive provisions. For example, a firm-fixed-price contract provides a strong financial incentive to control costs.

However, we also need to think about how incentives that affect profit will play out over the life of the contract and the life cycle of the program. It is not just the immediate contract that we care about. We need to think through profit incentives not only under the expected scenario but under any alternative scenarios that may develop, including the realization of any foreseeable risks. A cost-plus development contract that has reached a point where nothing is left to be gained or lost in fee by completing the effort doesn't include much incentive.

We also need to think carefully about unintended consequences. Industry may look at the situation very differently than we do. We can assume industry will try to maximize its profit—by whatever means we make available. We also can assume industry will examine all the available scenarios—including ones we have not intended. That means we need to anticipate industry's behavior and make sure that we align industry objectives with the performance we intend. In general, we also can expect industry to argue for incentives that come sooner in the period of performance and are easier to achieve. Usually that is not what we should be rewarding.

We also must recognize there is no motivational value in incentive fees or profits that are impossible to earn—or conversely that are very easy to achieve. The bottom line is that this isn't simple, and, as in much of what we do as acquisition professionals, careful thought and sound judgment based on experience play major roles. One of the items I am most interested in when I read a program's Acquisition Strategy or a request for proposal is the incentive structure and how it ties profit to performance. I particularly look for why the program manager and the contracting officer chose the proposed approach. Now I'd like to discuss some specific cases.

Product development: On our major competitive development contracts, industry has been receiving final margins of about 5 percent or 6 percent—about half the levels seen in production. (Note that this isn't where we start out; the reality of the risk in development programs leads to this result. Also note that margins on sole-source development contracts are significantly higher.) Industry accepts this lower outcome because of two things. First, competitive pressures force industry to bid aggressively and take risks in the development phases. Second, winning subsequent production contracts, with their higher margins and decades of follow-on work, makes it worthwhile to accept lower returns in development. Most often, the inherent risk of development makes a cost-plus vehicle appropriate, and profit then is tied to the incentive fee structure we provide. If the situation still is competitive after award, winning the future engineering and manufacturing development or production contract provides all the motivation to perform we are likely to need. However,

in a sole-source situation, we need to structure profit potential to affect desired outcomes.

The data from recent sole-source contracts show that formulaic incentive structures with share ratios above and below a target price are effective in controlling costs on the immediate contract. Often, however, performance on the current contract is not what concerns us the most. We may want lower cost in follow-on production or sustainment, or we may want higher performance in the final product, or some combination of parameters. This is where we need to be very thoughtful and creative about how we use profit to motivate desired behaviors and outcomes.

Early production: Usually when we award these contracts, we have a relatively mature design and a specified performance we intend to achieve, so cost control tends to dominate our use of the profit incentive. We generally use formulaic incentive share ratio structures during this phase. In the first iteration of BBP, we encouraged consideration of 120 percent ceilings and 50-50 share ratios, as a starting point, adjusting these structures to the situation at hand. The key to effective incentive contracting is to motivate the contractor to reduce costs as quickly as possible.

In the past, we have not done as good a job as we should have done in establishing realistic target costs. When we negotiate challenging but achievable target costs, we create an incentive arrangement that allows industry to earn a higher share of any underruns in early production. DoD should reap the benefits in future lots through lower prices. In addition, industry has more at stake here than the government: As we move up or down share lines, industry gains or loses what it cares most about—profit—at a much higher rate than the DoD gains or loses what it cares about—cost. For this reason, we should provide share ratios above and below target prices that give industry greater incentives (e.g., more favorable share ratios for industry below target and less favorable ones above target) to control cost.

Lowest price technically acceptable (LPTA): Industry has expressed concern for some time about the effect of this source-selection criterion on selections and profitability. I recently provided some policy guidance on this subject (see the March-April 2015 issue of this magazine). DoD's policy is to use LPTA only when there is (1) an objectively measurable standard of performance, and (2) there is no desire for any performance above some defined level of acceptability in that standard. In all other cases, we should use another form of best-value source selection. If LPTA is used properly in competitive source selections, it will give us the performance we desire and constrain profit levels to those necessary for

We have an obligation to ensure that we obtain fair and reasonable prices for the taxpayers whose money we spend.

businesses to be viable. That is what competitive markets do. While we aren't trying to artificially force profit down to reduce cost, we also shouldn't pay higher margins than those determined by competitive market forces for this type of work and standard of performance.

Commercial and commercial-like items: This is a particularly difficult area in which to achieve the right balance. Our policy is simple: If a supplier sells us a commercial item and the supplier can demonstrate that it sells that item in substantial quantities to commercial customers, we will pay what other commercial customers pay for similar quantities. When we buy truly commercial items, we compare prices, try to get volume discounts, and let the market set the price (often using tools like reverse auctions). When we buy a commercial item, the reasonableness of the price we pay is important to us—not the profit level a commercial company may make when selling that item. We must understand that the risk posture of a commercial company selling commercial items in a competitive marketplace is dramatically different than that of the traditional defense contractors with which we deal.

When we purchase items that may be sold commercially, or which are close in design to items sold commercially (sometimes referred to as "commercial of a type"), but for which there is really no competitive market to establish prices and margins, we have an obligation to ensure that we obtain fair and reasonable prices for the taxpayers whose money we spend. Examples include aircraft parts that are similar in design, but possibly not identical, to the parts used on commercial aircraft. In those cases, we have processes in place for our buyers to establish whether the item is commercial, and if it is, the fairness and reasonableness of the price. If an item is commercial, we only inquire about costs (and profit margins) when we have exhausted the other available means of determining price reasonableness.

Logistics support: We started emphasizing Performance Based Logistics (PBL) in BBP 2.0 as a way to reduce costs and improve outcomes on product support contracts. As we went through the difficult fiscal year 2013 sequestration scenario, our use of these types of arrangements actually declined. Today I am tracking the use of PBL through quarterly reviews at the Business Senior Integration Group. PBL is an effective tool that ties profit to performance in a way that has been demonstrated to be a win-win for DoD and industry. PBL is harder to implement and execute than other business arrangements, but the payoff is well established by the historical results; PBL profit incentives work to enhance performance and reduce cost. **[Editor's Note: Also see PBL article beginning on p. 14.]**

Support services: In these contracts, we often buy some form of administrative or technical support to carry out routine functions that are not inherently governmental. There may be metrics of performance to which we can tie profitability, —and, if they are available, we should use them. Often, however, services are about the productivity and basic skill sets of individuals working on location alongside DoD military or civilian employees. At one point, we routinely used time-and-materials or firm-fixed-price contract vehicles for these types of support services. A preferred approach is often the use of cost-plus-fixed-fee arrangements to pay actual costs coupled with DoD contract manager oversight with discretion over the acceptability of assigned contractors. In these cases, quality can be controlled by rejecting contractor staff members who are not performing up to contract standards. Since profitability will depend on providing acceptable staff to bill for, the incentive to do so is high.

Conclusion

Industry can be counted upon to try to maximize profitability on behalf of its shareholders and/or owners—that's capitalism. Our job is to protect the interests of the taxpayers and the warfighter while treating industry fairly and in a manner that won't drive businesses away from working for DoD. To achieve these complex objectives, we should strive to ensure that we create business deals that provide industry an opportunity to earn fair and reasonable fees/profits, while protecting the government's interests. Industry will respond to profit incentives if they are achievable with realistic effort. We will benefit if profit incentives provide effective motivation to industry and are tied to the goals we value.

There is plenty of room for creativity in this area because our business situations vary widely. It is up to each of us to determine how profit incentives should be structured so that reasonable profit margins can be earned with reasonable performance levels, superior performance results in higher margins, and inferior performance has the opposite effect. ☈

Becoming a “Chaosmeister”

John Higbee

These are the times that try [our] souls.” What was said in Revolutionary War times seems as apt today. Resources are shrinking. Our workforce is changing significantly with the departure of the baby boomers. The warfighter’s needs are in great flux, creating instability in Department of Defense (DoD) and military Services requirements. The gulf between Congress and the Executive Branch continues to widen, causing inconsistent direction and uncoordinated oversight. Industry is changing how it works with DoD, adding to the turmoil. Defense acquisition, always a tough job, is getting tougher.

Is the defense acquirer’s job in a “no-win” situation? It depends on our perspective.

If we approach the challenge purely as administrators of processes, who can only do what we are explicitly told to do, we are indeed in for an unrewarding, unfulfilling time.

If we approach the challenge as operators—committed to innovating and adapting tools and processes to support our goals, creating networks and coalitions that can enlarge our ability to advance our projects, striving to understand the chaotic operational environment of federal and defense acquisition, and leveraging opportunities that come from that understanding—we can achieve results beyond our most positive expectations.

Higbee is director of Mission Assistance and Knowledge Repository at the Defense Acquisition University at Fort Belvoir, Virginia.



Becoming an acquisition operator—a “chaosmeister”—is not easy. But it is achievable. Each of us has, or can gain, the knowledge and experience to be an effective acquisition operator—if we adopt this “operational perspective.”

The Acquisition Environment

The defense acquisition environment is chaotic. Multiple senior organizations and individuals—inside and outside government—have specific aims. Many focus on disparate goals that do little to achieve effective or efficient acquisition outcomes.

Let's look at some of the major factors.

Federal structure/constituency-created funding instability: The Constitution's separation of powers prevents “the man on horseback” from seizing all control. That separation has a price—it creates intricate “checks and balances” and slows action. Money takes two years to proceed from need identification to enactment of a budget. It takes longer if slowed by continuing resolutions. The annual DoD, presidential and congressional

reviews of funds, often driven by divergent interests, frequently lead to financial instability and acquisition inefficiency. Partisan gridlock has damaged the collaborative dynamic essential to productive government operations.

Requirements instability: The DoD's strategic vision, and the warfighting capabilities required to achieve it, are in great flux. The DoD must meld the inputs from the Executive Branch and Congress into a coherent program that meets future requirements, while sustaining the real-time needs of combat commanders—all this in the face of steadily decreasing resources and dynamically changing threats.

It is unsurprising that the dynamic tension has never been greater between “maintaining the status quo” and “addressing the new realities.” This affects efforts across the entire acquisition cycle—from concept through fielding to sustainment and retirement.

Leadership changes also contribute to instability: A new presidential administration, a shift in congressional committee leadership, a new uniformed head

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of a Service—any of these can change requirements (and acquisition activities) significantly.

Technology “inefficiency”: Science and technology (S&T) organizations, and acquisition organizations, have not been routinely and robustly linked. Any effective linkages have been due to the enterprise of individuals (technologists and acquirers) who have taken the initiative to seek out each other and work together. And the acquisition system, somewhat permeable at best to technologies proposed early in the prototyping phase, becomes virtually impermeable to these technologies once a prime contractor enters the picture.

Inherent Chaos

The defense acquisition environment includes hundreds of organizations, each overflowing with policies and processes that, unfortunately for the acquirer, are not uniformly designed to work well with each other. There are gaps in the process and policy interfaces between the organizations.

Each organization jealously guards its own priorities. In determining its activities, defense acquisition depends on inputs and guidance from organizations encompassing the key decision processes (i.e., requirements, resources, acquisition and technology). The divergences and disparities between organizations are dealt with by the acquirer.

Acquisition improvement initiatives created by any one organization will be limited in their enterprise-wide effectiveness by the span of the other organizations’ authorities. For example, the multiple initiatives crafted by the DoD to streamline processes and improve acquisition efficiency are limited by the competing authorities of Congress, Service and DoD leaders in budgeting, requirements and technology development. One group’s goal to “reduce redundancy” by eliminating a reporting requirement may be viewed in quite a different light by another stakeholder, who may insist that the requirement be retained.

Operations in Defense Acquisition

Defense acquisition inherently is an operational environment, and the acquirer is the key to it. This environment includes autonomous organizations conducting uncoordinated operations in the same space. Most of these operations tangibly affect other operators in the space. Each organization has known characteristics, processes, policies, goals and personnel. Each also has discernible attitudes toward the other organizations, including individual programs and acquisitions. This organization-specific information can be gathered and analyzed to provide situational awareness for the acquirer’s use in establishing a “way ahead” (similar to how intelligence shapes warfighter operations in a tactical environment). Accordingly, the acquirer must assess his acquisition’s unique environment and determine his or her tactical plan for optimizing program outcomes.

Train Acquirers as Operators

Acquirers must train as warfighters are trained—not only mastering necessary individual skills but also team skills and situational awareness (the ability to assess and exploit the chaotic environment to achieve their goals). So, how do operators train?

First, an operator works to achieve an operational (outcome-based) goal. For instance, a ballistic missile submarine crew’s goal is to provide a strategic deterrent patrol with continuous and undetected availability of the ship’s strategic weapons battery.

Do acquirers have a similar operational goal? One readily presents itself: to consistently deliver defined warfighting capability within allocated resources. (“Resources” here specifically refer to people, technology, funding, facilities and schedule.)

Now that we have an operational goal for acquisition, how do we develop the “acquisition operator”? For starters, take a



page out of the process for developing warfighter operators (the Navy process is depicted below):

- Train the warfighter to master an individual specialty (e.g., sonarman, machinist mate, etc.).
- Train the warfighter to be an effective member of various operational teams (e.g., watchstanding teams, damage control teams, etc.). Do this in parallel with individual training.
- Train the warfighter and these operational teams to use intelligence and/or situational awareness to proactively execute mission goals by intelligently adapting tactics as the warfighting environment changes—both to seize tactical advantage and to minimize operational risk.

How does this approach convey to “acquisition operations”? Let’s look at our acquisition environment and our “Spheres of Control/Influence/Concern”:

- What can I *control* that affects performance and outcomes?
- What can I *influence* (outside my sphere of control) that affects performance and/or outcomes?
- What am I *concerned* about in my environment (outside my spheres of control or influence) that affects performance and/or outcomes?
- How can I *adapt* my strategy and/or actions to take advantage of the opportunities and manage the risks identified in this environmental scan?

Mapping our environment along the above lines will reveal a practical approach to creating the acquisition operator.

First, optimize every acquirer’s ability to contribute within his or her spheres of control or influence, both as an individual (career field and tools knowledge—the sphere of control) and as a team member (both in standing [e.g., program] and in functional [e.g., integrated product] teams—the sphere of influence). Finally, optimize each acquirer’s ability to operate effectively by remaining “situational aware” of the environment outside his or her spheres of control and/or

influence (the sphere of concern). We develop individual understanding and situational awareness that translate into agile, thoughtful exploitation of our “real world” and enables improved acquisition outcomes.

Historically, Defense Acquisition Workforce development has centered on the individual acquirer, focusing on his or her career field. The other two “operational aspects” of defense acquirer development have received comparatively little formal emphasis.

Team training has been an adjunct to Defense Acquisition Workforce Improvement Act and executive courses—training cohorts using students from across the workforce, as opposed to intact teams such as those that operate together routinely. This began to change over the last few years as intact teams, from both government and industry, are brought together in Acquisition Program Transition Workshops to deal with real issues and collaboratively define strategic and tactical plans. Intact government acquisition teams also are brought together in the Services Acquisition Workshop and, from their actual data, develop practical products team members can use in the workplace.

Situational awareness of the acquisition environment, when discussed, usually is the province of the more advanced 300-level and executive courses. Individual development of this talent usually depends on whether a person connects with a mentor (senior or more experienced peer) who takes the time to convey that tacit knowledge and experience to the mentee. This does not always occur.

“Chaosmeistering” Behaviors and Skills

We’ve talked about the basic theory of the acquisition operator (the “chaosmeister”). What behaviors and/or skills should a “chaosmeister” demonstrate?

Create a strong alliance with your boss and keep him or her informed. Your relationship and communication with your boss

is absolutely essential to effective “chaosmeistering.” A strong relationship will provide both valuable “top cover” as you proceed—and a senior partner in strategizing how to create and conduct your campaign. Your boss can then create additional “top cover” by keeping the chain of command informed and involved. Finally, real-time communication with your boss is a key to retaining this essential support—particularly if problems or issues arise.

Stop agonizing—start doing! It’s harder to be run over if you’re moving. It is easy to be daunted into immobility in today’s acquisition environment. There are many stakeholders, customers and partners, and they all seem to urgently want something different from the acquirer (often simultaneously). Combine that with the phalanx of “checkers” who will not let you pass until they are given precisely what they want, and the “reactive crouch” can become the acquirer’s default position.

It is much better to determine your scope of authority and energetically move your program forward within your scope of control. Programs typically suffer more from lack of decisions than from erroneous decisions. Very few decisions are made that cannot later be “course corrected” to take into account change or new data. Programs not making strong progress stand out when DoD leaders face resource cuts. The only irreparable decision is to remain at “all stop”: The “loss of opportunity” can be staggering. As long as your immediate leadership understands where you are going and is kept informed as you proceed, you’ll be in good shape with this approach.

There is no “unified field theory” for defense acquisition. There is something really comforting about a good old-fashioned detailed process or checklist. It provides a sense of completeness and security: “All I have to do is execute this and everything will turn out all right.” What a shame this is not an acquirer’s reality! Working within defense acquisition is much more like a war game than a checklist.

The DoD includes hundreds of processes and policies. They work well in isolation. Some even work well with other processes. None works perfectly with all the other processes. Acquirers (individually and in teams) are the bridges that join these processes. You need to know the art of the deal and to collaborate, partner and tailor processes intelligently to make them work for a specific situation. It really is up to you.

Build alliances. There is strength in the (right) numbers. The warfighter always has striven to create and operate within alliances. The reasons are obvious: More people working toward the same end provide greater resources, a richer strategic and tactical “brain trust” and added situational awareness. The same principle holds true in acquisition. The acquisition environment has myriad organizations, each working toward its own specific goals. Other organizations can become your allies

and align with you if you can convince them that your goals and their goals are mutually supportive.

Develop your own “situational awareness” network. Share the information with your allies. Military intelligence always has been essential to warfighter success. Without intelligence, operations are blinded, with potentially disastrous results. The churn of federal acquisition requires the same type of upfront information—“situational awareness.”

Acquirers often tend to stick to acquisition-specific processes and tasks, trusting that people outside their immediate organizations will provide good situational awareness information in time for it to be acted upon. Unfortunately, this doesn’t always happen. Due to the volume of activity in federal acquisition, and the reduced acquisition staffing at Services levels and in the Office of the Secretary of Defense (OSD), this information may arrive late or not at all, creating reactive situations with few good choices.

What can you do? Create your own “situational awareness” network. First, you can personally scan various information sources to understand events that may affect the DoD, your Service and your acquisition—and get the word out to your organization. To share this information, your “situational awareness” network can include your allies across the broader acquisition environment. One of the best ways is to pass on information that you know a network member will find useful—even if it has no benefit to you. This allows us to realize an additional objective: *Treat your partners as you want to be treated by them (the acquisition “golden rule”).* That network member will remember your “good deed” and reciprocate—sometimes providing key information at critical junctures.

Don’t be afraid to “get out of the box.” The fact that you are unconventional doesn’t by itself mean you’re not right!

Acquirers are like all people: They gravitate toward “positions of comfort” and traditional execution paths. This can work in a stable operating environment. It can lead to failure in today’s dynamically changing environment. Operational chaos often demands departures from the “positions of comfort” in acquisition to find the “ways that work.” These departures will disturb the “status quo” in your organization, but don’t hesitate to propose the changes needed for success. Opportunity for change is time sensitive; opportunity windows tend to close rapidly. So we, as acquisition operators, must seize them while they exist!

Understand the “players” and their motivations. We cannot foretell detailed outcomes in the multiplayer acquisition environment. We can, however, discern the motivations and goals of the major players and their positions regarding our organization’s programs by observing their actions. We can use that information to help determine our strategy and tactics and create a viable “way ahead.” This situational awareness

can be parlayed into campaign plans that leverage acquisition environment opportunities and mitigate threats. This situational awareness requires no senior permission and no complex applications or business systems. It only requires looking periodically at the available information sources (for example, industry, press, Congress, Service, OSD, Office of Management and Budget, Securities and Exchange Commission, Joint Staffs, Combat Command, and international sources) inside and outside the DoD that pertain to your project's environment. Collect the information, analyze it and move out on your conclusions. Again, don't hesitate to share what you've learned across your network. You may inspire others to look at their own environments.

Understand and use the “big waves.” Add the “wave’s momentum” to your own.

In the mid-1990s, the DoD was wed firmly to Weapons C3I (command, control, communications and intelligence) programs that shared several basic characteristics. They were highly integrated with huge centrally hosted, multi-layer software, using equipment that complied with military specifications. The immense “sunk cost” of these programs powerfully incentivized future systems to remain based on that model—within both the DoD and the major DoD prime contractors. Unfortunately, modifying and upgrading these tightly integrated systems required a lot of time and money. Operators became very dissatisfied. At the same time, using commercial off-the-shelf (COTS) and Open Architecture (a “big environmental wave”) was becoming the industry standard for telecommunications and C4I (C3I plus computers) sectors.

The Navy’s submarine force decided to “depart the pattern” of high integration by using a COTS-based, federated open-architected system (allowing the addition of “plug and play” subsystems) with controlled interfaces and a well-designed life-cycle support plan based on an assessment of COTS compliancy. This required top-level Department of Navy support, and an outreach strategy to the major C3I contractors, keeping them apprised of the Navy’s intent and encouraging them to participate. The result was an extremely capable and supportable Virginia-class nuclear-powered attack submarine C3I system with huge reductions in both development costs and ship-set costs.

Identify and use the “big waves”—they can take you a long way and may be the most effective way to break a “sunk cost paradigm.”

Don’t take “no” for an answer until you’ve reached the “head guy”—the “five noes” theory. So you’ve come up with an innovative solution, and now you need to socialize it with key players (e.g., contracting, legal, technology and testing). You go to your contracting officer, lawyer, science and technology expert or tester and you get an unequivocal “no.” Is that the end? It shouldn’t be. As the acquisition workforce shifts to its “post-

boomer” configuration, it will become smaller and at least in the near term will contain less experience. Less-experienced people may provide more “black and white” answers, fewer “shades of gray.” Possibilities often reside in the shades of gray, which are discerned best by folks with extensive experience across a wide variety of acquisitions. Getting to those people, who often are group leaders, may require multiple elevations of the issue to reach their level—thus “the five noes.”

It’s worth making those efforts, both in obtaining high-level support for an innovative effort and in “opening the aperture” for junior individuals who can then better appreciate the “breadth of opportunities.”

Find the optimal path. If you understand your program’s operating environment, you will know where “paths ahead” and the “obstacles to progress” are. This will allow you to develop ways to exploit the paths and avoid or mitigate the obstacles. Working with your chain of command and your network, you will gain a wider and more experienced group to help assess these obstacles and develop more ways to resolve them. In certain cases, your allies may be able to provide an opponent a different perspective on why your effort should go forward. Identifying the optimal route for your program never is wasted effort!

Listen and act on your “gut feeling”—it recognizes a problem first. “Gut feeling,” “intuition,” “subliminal cogitation”—call it what you will—is a powerful tool, arising from the sum of your knowledge, experience and judgment. You should use it as much as possible. It often manifests itself as an “uneasy feeling” or waking up at 3 a.m. with a concern. It may not provide an answer right away, but acting on it is the first step. Disregarding it eliminates an “early warning” that can spare you and your organization much pain. One way to address that “gut feeling” is to pull together those involved to discuss the actual situation in your area of concern.

My first commanding officer (CO) asked a key question in his qualification interviews for prospective officers of the deck (OODs)—those who would run the ship on a watch-to-watch basis: “When do you need to call me for advice or guidance?” Usually, an OOD candidate would laboriously discuss various scenarios. Eventually, the CO would hold up his hand and say: “You’re making this too hard. You need to call me any time you ask yourself the question, ‘Should I call the captain?’” The time to act on a “gut feeling” is when it occurs.

Keep your partners and chain of command in the loop as things happen. Avoid misunderstandings. “Stuff happens”: That is a constant across all acquisition efforts. The other constant is that your chain of command eventually will know about it. Given those two constants, it is in your best interests to “disclose early” and provide planned corrections (which, hopefully, you’ve already begun executing). Doing so will maintain your credibility with your customers and chain of command, get your story out first and retain the leadership’s confidence.



Move forward as soon as you can provide a good outcome. This takes a page from industry's book (particularly in information technology). If you are developing capability in an area of continuous growth or churn, trying to capture the "90th percentile" of capability before fielding usually is not a "best value" approach for the customer. It is better to get a good level of capability out early, as long as it meets the "know what you're delivering" mandate from Under Secretary of Defense for Acquisition, Technology, and Logistics Frank Kendall. Doing so supports early fielding and directly involves the user in product refinement. Let user inputs on the actual product guide the "good to great" progression effort.

Be a "junkyard dog" in searching for resources. Don't wait for the handout—it may not come. As the traditional sources of money shrink, leveraging everyone's favorite appropriation ("other people's money") becomes increasingly important. Sources such as the Small Business Innovative Research (SBIR) and Science and Technology (S&T) Funds can plug critical gaps in an acquirer's budget, if leveraged in accordance with the conditions for their use. SBIR comes to the program for use in program initiatives. S&T (6.2, 6.3, and 6.4) resources at Service and DoD laboratories can be leveraged by acquirers to produce needed technologies in collaboration with the laboratories that own the funds. Your organization has to do the liaison or present the proposal, but augmenting your budgets is worth that effort.

Advertise. Someone you don't know needs what you're doing. If your product could be used across Service and agency boundaries, it is worth your time to visit these potential customers and provide information (maybe even a demonstration). You'll be surprised how many people haven't heard about your "available capabilities." Advertising (writing articles for DoD or Service publications and being interviewed by trade publications) can get the word out. As defense budgets shrink, users will look for existing capabilities they need but don't have to develop. Finally, don't neglect foreign military sales for your products. The defense industry is moving strongly in this

direction, which you may find is of common value to you and your prime contractor.

Call "I don't have it!" in time to survive it. Know your limitations and those of your team. Many acquisition leaders are "Type A," take-charge, confident and aggressive personalities. Many others emulate "Type A" characteristics. While this normally provides positive energy, one particular trait—the leader's confidence that he or she can solve a problem—can itself present a problem if taken to extremes. Specifically, some problems cannot be resolved by the organization or the leader alone. A leader who does "not admit defeat" until catastrophe is imminent can prevent discovery of solutions that are available through working with outside partners or senior leadership. It's like the outfielder who waves away other team members as he races to catch the long fly ball: He is sure he has it—until he doesn't! The acquisition leader must be prepared to call the "I don't have it" point early so that external partners and senior leaders can invoke solutions at their level. This may produce disagreements within the team. But it is important to preserve the ability to find and implement solutions outside the organization's scope if its own "best efforts" fail. Your boss will not appreciate your "ownership" if it prevents him from helping you on a tough problem!

Read history. You may find your answer there. Past experiences can open doors. History is full of people facing the same types of problems or opportunities. Whether they succeeded or failed, understanding what they did and assimilating that hard-gained knowledge is worthwhile. Examples include:

- Marrying technology breakthroughs to warfighter need: Adm. Hyman Rickover and the nuclear submarine; Rear Adm. William F. Raborn and seaborne ballistic missiles; the first 50 years of military aviation.
- Recapitalizing warfighting capability: British Adm. Sir "Jacky" Fisher and the Royal Navy revolution (1904-1910); standing up the Union Army in the Civil War (1861-1865).

Operational chaos often demands departures from the “positions of comfort” in acquisition to find the “ways that work.” These departures will disturb the “status quo” in your organization, but don’t hesitate to propose the changes needed for success.

- Asymmetric warfare and systems supporting it: American strategy and systems in the Revolutionary War; American naval construction (the “six frigates” program) and the War of 1812; British Adm. Lord Thomas Cochrane and asymmetric tactics (1800–1850).

The principles and the human factors are the same. Only the technologies differ. And don’t just look at the “good guys” or “winners.” History’s “bad guys” or “losers” also provide valuable knowledge.

Processes are there to support you—not vice versa. How can one negotiate the “land of the checkers”? If one thing has become apparent in recent years, it’s that senior leadership and warfighters share an overriding interest in achieving meaningful operational outcomes. Conducting two extended wars and the recent budget reductions require us to identify better methods for meeting real needs with real capabilities. This overriding interest also has allowed us, as acquirers, to challenge and modify processes that impede these outcomes. Unfortunately, not everyone got (or accepted) the word on this change. When you encounter this, remember the “five noes”: Challenge the decision or direction and go “up the chain.” This is where your senior leadership can engage to excellent effect, enabling the challenge (if necessary) to get to senior OSD or Service acquisition leadership for resolution.

Find a mentor. For thousands of years, long-term mentoring has been the way to inculcate true mastery of complex professions. Progression from apprentice to journeyman to master included not only learning the professional skill sets but gaining command of the “art.” This was best done over time in a personal relationship between master and aspirant. This allowed the master to provide the aspirant his experiential knowledge—the “art” that complemented the “science.” This principle is as important, and as effective, as ever. Unfortunately, one does not automatically acquire a mentor. Most people must search for one. While your immediate boss might be a good choice, his or her workload may preclude performing

this role. So you may want to find a senior individual outside your chain of command. Contacting past bosses or a reference from your current boss to an acquisition leader he or she respects are good ways to obtain a mentor.

Looking Forward ...

The challenges and inherent chaos of today’s DoD acquisition environment demand that we depart from “rote process execution” and adopt innovative, critical thinking. Our chaotic operational environment can help us find ways ahead if we choose to exploit it, rather than be limited by it. Acknowledging our identities as acquisition operators and adopting operational techniques (developing high-performing teams and cultivating and using situational awareness) are critical keys to delivering warfighting capability.

Doing this is within the reach of every acquirer. It may require a change in mindset, and acceptance of increased risk, but there is enormous potential for improved warfighter support and job satisfaction in being a “chaosmeister!” &

The author can be contacted at john.higbee@dau.mil.

MDAP/MAIS Program Manager Changes

With the assistance of the Office of the Secretary of Defense, *Defense AT&L* magazine publishes the names of incoming and outgoing civilian and military program managers for major defense acquisition programs (MDAPs) and major automated information system (MAIS) programs. This announcement lists a recent change of leadership.

Navy/Marine Corps

Capt. Daniel M. Brintzinghoffer was assigned as program manager for the newly established Frigate (FF) Program Office, PMS 515, on Jan. 28.

Performance-Based Logistics

A Readiness Strategy
Tailor Made for Austere Times

Bill Kobren



```
Console.WriteLine("Enter a value between 0 & 100")
Median = Console.ReadLine()
Console.WriteLine("The median is " + Median)
Console.ReadLine()
```



In November 2012, the Department of Defense (DoD) identified “increas[ing] the use of performance-based logistics [PBL]” as a key initiative in support of DoD’s goal to incentivize productivity in industry and government, saying, “There is sufficient data on the effectiveness of PBL at reducing cost and improving support performance to conclude that if it is effectively implemented and managed, PBL yields significant benefits. Key activities include increasing the knowledge base of PBL through standard processes, tools, and training.”

Why Is This Important?

Before we answer this question, it’s important to remind ourselves exactly what we mean when we use the term PBL. The DoD defines PBL as being “synonymous with performance-based life cycle product support, where outcomes are acquired through performance-based arrangements that deliver warfighter requirements and incentivize product support providers to reduce costs through innovation. These arrangements are contracts with industry or intra-governmental agreements.”

So why does this matter? Why did senior leadership specifically identify “increase effective use of PBL” as a priority DoD policy, training and execution initiative? In a nutshell, when properly implemented, PBL works. In fact, when PBL is properly structured and executed, weapon system operating and support costs actually can be reduced, while performance concurrently increases.

How Is This Possible?

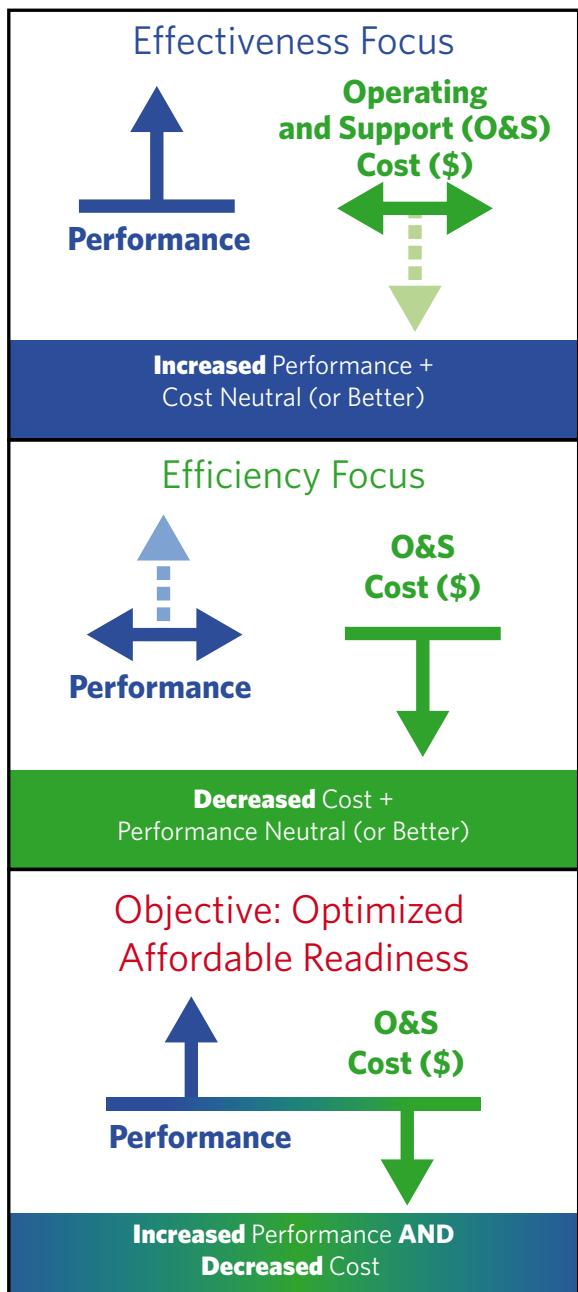
Simply put, successfully implementing PBL Product Support Arrangements (PSAs) requires equal parts leadership, expertise, persistence and good old-fashioned “elbow grease.” It entails incentivizing both the right behaviors and the clearly stated outcomes by using the right, carefully chosen balance of warfighter-focused metrics. These include outcomes that facilitate both product and process improvements to drive out cost and drive up readiness as well as outcomes that encourage supply chain and maintenance process efficiency, technology insertion, investment in reliability, maintainability and supportability improvements, and proactive obsolescence and the mitigation of Diminishing Manufacturing Sources and Material Shortages (DMSMS). In short, we are looking for outcomes that encourage rather than stifle creativity and innovation of product support managers (PSMs), product support integrators (PSIs) and product support providers (PSPs). These areas can be stifled by specifying too much prescriptive “how-to” instead of focusing on both the “what” the warfighter requires and the “how much” the Service or program can afford.

As the new January 2015 DoD Instruction 5000.02 clearly articulates, “PBL is performance-based product support, where outcomes are acquired through performance-based arrangements that deliver warfighter requirements and incentivize product support providers to reduce costs through innovation.”

Generally these requirements tie directly back to the department’s “big four” key life cycle sustainment outcome metrics (the Operational and Materiel

Kobren is director of the Logistics and Sustainment Center at the Defense Acquisition University at Fort Belvoir, Virginia.

Figure 1. Product Support Arrangements Need Not Be an Either/Or Proposition



Availability components of the Sustainment Key Performance Parameter [KPP], Reliability Key System Attribute [KSA], Operating and Support [O&S] Cost KSA, and a separate Mean Down Time [MDT] metric), either directly to these top-level metrics themselves, or more frequently, to other supporting reliability, availability, maintainability, supportability, cost or other logistics metrics. Details are spelled out in both Appendix D (Enclosure D) of the February 2015 *Manual for the Operation of the Joint Capabilities Integration and Development System (JCIDS)* and Appendix F of the May 2014 DoD PBL Guidebook: *A Guide to Developing Performance-Based Arrangements*. Indeed, as the latter clearly states,

"Identifying Warfighter requirements, expressed as a system-level outcome metric, is the first step toward establishing a PBL arrangement. ... Most PBLs are executed at the subsystem or component level, however, so the system-level metric typically must be decomposed to lower-level metrics appropriate for the level of delegated responsibility and risk assigned to the PSI [product support integrator] and PSP [product support provider]. These are the metrics that will be included in the PBL arrangement, and the outcomes of these arrangements must be linked to the overall system-level metric."

"Metrics are used to track, measure, and assess the implementation and effectiveness of the performance-based logistics arrangement as executed by the PSI or PSP. Metrics are the means by which the PM and PSM gain understanding of the product support solution and identify any gaps between required and actual performance. Understanding enables adjustments to the support solution to optimize product support operations and Warfighter outcome."

"Metrics should be selected or constructed to encourage performance improvement, effectiveness, efficiency, and innovation. There is no perfect metric, but selecting an appropriate complementary set of metrics will promote the desired behavior and outcome while minimizing unintended consequences. Effective metrics ensure PSI and PSP activities are aligned with the Warfighter mission, contribute to meeting Warfighter requirements, deliver an on-time, quality product, and reduce (or avoid) cost."

But I Thought I Heard ...

Before we proceed any further, however, let's dispel a few potential misperceptions about PBL:

Misperception No. 1—PBL is a new concept, a "flash in the pan" or another "flavor of the month." Not so. PBL has been used in DoD since 1998, and as such, has successfully delivered improved product support outcomes for more than 15 years. In addition to being widely used in the commercial aviation engine world, PBL product support arrangements also are being implemented internationally, including in the United Kingdom and Australia, and are being considered in a number of other countries. Additionally, according to the DoD PBL Guidebook, "PBL has been the preferred sustainment strategy since the 2001 Quadrennial Defense Review (QDR) [stated], "DoD will implement PBL to compress the supply chain and improve readiness for major weapons systems and commodities." Since then, it has been both DoD policy and a strategic priority to increase the use of performance-based arrangements to deliver product support solutions that satisfy Warfighter requirements." The very fact that increasing the effective use of these strategies has been a Better Buying Power initiative since 2012 testifies to DoD's commitment to PBL product support arrangements over the long haul.

Misperception No. 2—PBL is synonymous with contractor logistics support (CLS) or outsourcing. To the contrary,

PBL is a product support strategy. While successful PBL arrangements can—and often do—leverage industry PSIs and/or PSPs, the key is the right long-term product support arrangement with the right metrics and incentives adhering to the right tenets, not who serves in those capacities. As emphasized in the March-April 2012 *Defense AT&L* magazine article, “Performance Based Logistics and Project Proof Point—A Study of PBL Effectiveness”: “PBL strategies are not synonymous with, nor should they be confused with Contractor Logistics Support (CLS). Successful PBL strategies leverage a best value mix of both public and private sector capabilities.” Or as the DoD Instruction 5000.02 simply puts it, “product support integrators and product support may be organic, commercial, or a combination.”

Misperception No. 3—PBL primarily is an industry initiative.

Again, not the case. While industry recognizes the potential opportunities afforded by PBL product support arrangements, it also understands the potential challenges and inherent risks associated with implementation, particularly under a fixed price contract. PBL is actually and indeed has long been an integral part of DoD policy. DoD Directive 5000.01, paragraph E1.1.17, for example, directs that “PMs shall develop and implement performance-based logistics strategies that optimize total system availability while minimizing cost and logistics footprint.” Moreover, as DoD Instruction 5000.02 goes on to state, “the Program Manager, with the support of the Product Support Manager (PSM), will ... develop and implement an affordable and effective performance-based product support strategy. The product support strategy will be the basis for all sustainment efforts and lead to a product support package to achieve and sustain warfighter requirements.”

Misperception No. 4—PBL costs the government more than traditional transactional support. In reality, properly structured, properly implemented, and properly managed PBL arrangements actually can cost less. For example,

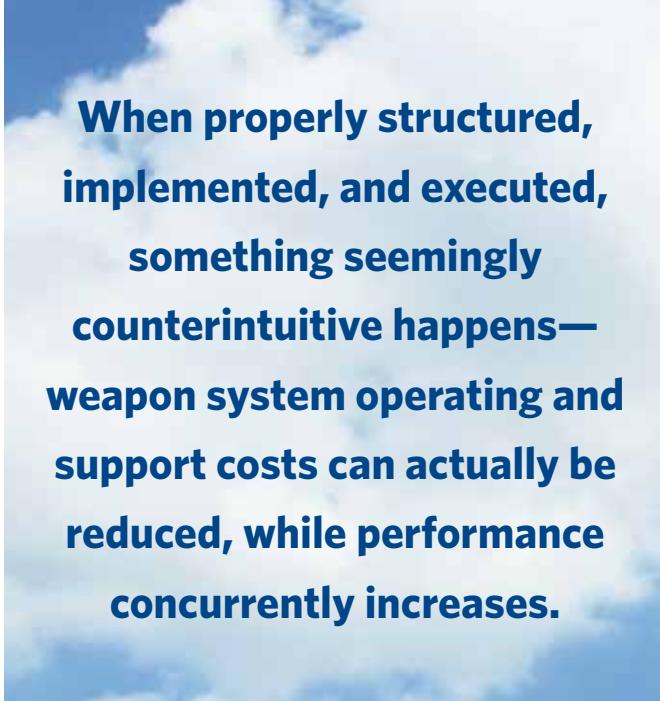
Simply put, successfully implementing PBL Product Support Arrangements (PSAs) requires equal parts leadership, expertise, persistence and good old-fashioned “elbow grease.”

criteria for award of a PBL at the Naval Supply Systems Command (NAVSUP) Weapons Systems Support (WSS) includes an analysis that documents a proposed PBL arrangement is “break-even” or better in comparison to the cost of traditional support. Aggregate analyses since fiscal year 2000 document a total 4 percent savings associated with the NAVSUP WSS PBL program. As the above-referenced 2012 Proof Point article actually stated, “The [21] PBL arrangements that were analyzed clearly reduced DoD’s costs per unit of performance while simultaneously driving up the absolute levels of system, sub-system and component readiness/availability.” Where results fail to manifest themselves, more often than not the issue is likely either a traditional transactional support strategy that does not incentivize product and process improvements or approaches that call themselves a PBL but fail to adhere to the 10 basic tenets of what constitutes a PBL product support arrangement. The reality, as borne out in detail in the 2011

Table 1. Tenets of PBL

Tenets Tied to Arrangements	Tenets Tied to Organization
<ol style="list-style-type: none"> 1. Acquire clearly defined warfighter-relevant outcomes, not just sustainment services or replacement equipment. 2. Use measurable and manageable metrics that accurately assess the product support provider’s performance against delivery of targeted warfighter outcomes. 3. Provide significant incentives to the support provider that are tied to the achievement of the outcomes (for aspects of performance that are within their control). 4. Firm Fixed Price (FFP) contracts are generally the preferred contract type (Fixed Price Incentive Firm (FPIF) and Cost Plus Incentive Fee (CPIF) may be effective). 5. Provide sufficient contract length for the product support provider to recoup investments on improved product (e.g., Mean Time Between Failure (MTBF) and sustainment processes (e.g., manufacturing capabilities). 	<ol style="list-style-type: none"> 6. PBL knowledge and resources are maintained for the Government team and product support providers. 7. Leadership champions the effort throughout their organization(s). 8. Everyone with a vested interest in the outcome is involved. 9. Supply chain activities are aligned to the desired PBL outcome versus disparate internal goals. 10. Risk management is shared between the Government, customer, and support provider.

Source: Table 1: Tenets of PBL (May 2014 DoD PBL Guidebook: A Guide to Developing Performance-Based Arrangements).



When properly structured, implemented, and executed, something seemingly counterintuitive happens— weapon system operating and support costs can actually be reduced, while performance concurrently increases.

Project Proof Point study, in short is that "PBLs do work (when there is substantive program adherence to PBL tenets)."

Misperception No. 5—PBL arrangements stifle competition. The reality is that, like PBL itself, competition serves as a powerful and effective mechanism for incentivizing PSIs and PSPs to reduce costs, invest in product improvements, and/or drive process and efficiency enhancements. Akin to PBL, as stated by the new December 2014 "Guidelines for Creating and Maintaining a Competitive Environment for Supplies and Services in the Department of Defense:"

...competition, direct or indirect, is the most effective motivator for industry to reduce costs and improve performance. Competition creates an incentive for contractors to provide goods and services at a lower price (economic efficiency). Competition spurs innovation of transformational technolo-

gies, which allows the DoD to field the best weapon systems for our warfighters quickly. Competition yields better quality products and services. Firms that produce low quality are driven out of the market and are unable to effectively compete effectively. Competition affords the DoD the opportunity to acquire performance improvements (e.g., faster, lighter, more sustainable) by using "best value" source selection criteria.

Even in instances where multiple product support integrator or provider competitors are not available to choose from, the Proof Point study concludes that "well-crafted PBL arrangements 'manufacture competition' by incentivizing companies to compete against internal waste and quality challenges in order to drive up quality (thereby reducing demand) while simultaneously driving down process, labor and material costs." In essence, a well-constructed PBL arrangement can serve as a powerful tool to create internal competition that incentivizes improved performance and efficiencies designed to drive out cost.

Key actions the DoD has undertaken to date to facilitate implementation of this BBP initiative are spelled out in an article titled "Performance-Based Logistics for Achieving Affordable Readiness" in the January–February 2015 edition of this magazine, including the issuance by the Acting Assistant Secretary of Defense for Logistics and Materiel Readiness of performance-based logistics comprehensive guidance in November 2013 and the *PBL Guidebook* in May 2014. DAU continues to inculcate PBL training into a range of new and updated interdisciplinary learning assets targeted at both the life-cycle logistics and broader defense acquisition workforce.

"Putting Some Shoe Leather" to This

Some would contend that policy, guidance, and training will only take you so far. Actually putting this into practice—and consistently delivering the desired results—must be the next step. Fortunately, the DoD is not new at this—in many cases,

Table 2. Performance-Based Life-Cycle Product Support Resources

Resource	Web Link
PBL Guidance Memorandum	https://acc.dau.mil/CommunityBrowser.aspx?id=686632
DoD PBL Guidebook	https://acc.dau.mil/pbl-guidebook
PBL Community of Practice (CoP)	https://acc.dau.mil/pbl
PBL ACQuipedia Articles	https://dap.dau.mil/acquipedia/Pages/Default.aspx
PSM Toolkit	https://acc.dau.mil/psmtoolkit
PSM Guidebook	https://acc.dau.mil/psm-guidebook
Secretary of Defense PBL Awards	https://acc.dau.mil/CommunityBrowser.aspx?id=527436
Product Support Key References	https://acc.dau.mil/productsupport
CLL 011 Performance-Based Life Cycle Product Support (PBL)	http://icatalog.dau.mil/onlinecatalog/courses.aspx?crs_id=269
CLL 031 PBL Contracting Strategies	http://icatalog.dau.mil/onlinecatalog/courses.aspx?crs_id=1982
LOG 235 Performance-Based Logistics	http://icatalog.dau.mil/onlinecatalog/courses.aspx?crs_id=98
LOG 340 Life Cycle Product Support	http://icatalog.dau.mil/onlinecatalog/courses.aspx?crs_id=1792

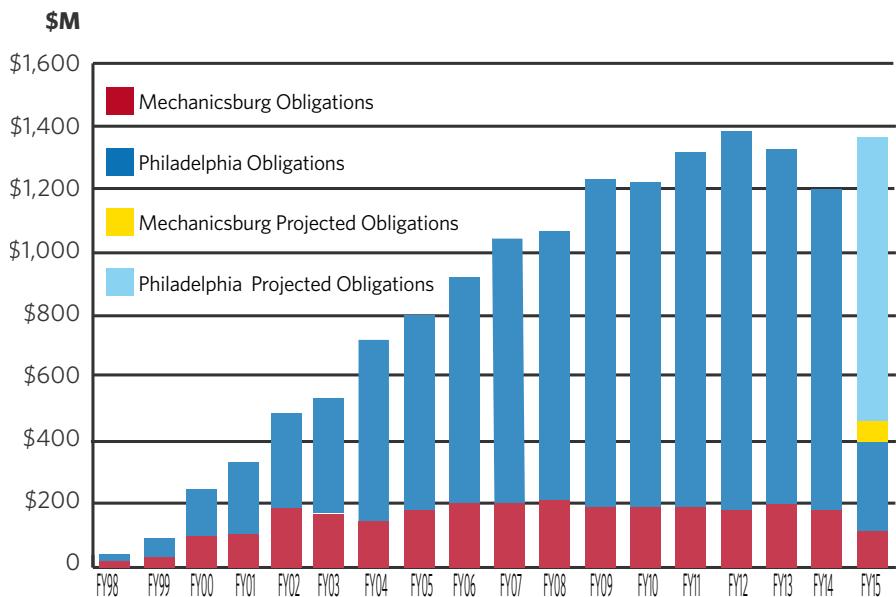
having leveraged, learned from and fine-tuned PBL arrangements for many years. A few lessons are available from our colleagues at the NAVSUP WSS in Philadelphia, whose efforts in this arena have resulted in major improvements in system readiness and warfighter support. According to NAVSUP PBL subject-matter experts, in fiscal year 2014, PBL product support arrangements accounted for nearly 27 percent of NAVSUP WSS obligations; and in fiscal year 2015, accounted for more than 25 percent of total demand. In the process, the NAVSUP, working in tandem with the Naval Air System Command (NAVAIR), has captured an unparalleled 15 of the 34 Secretary of Defense Performance-Based Logistics Awards over the last decade, including most recently, the H-53E helicopter program PBL arrangement winning the 2014 component-level DoD award.

How have they achieved such significant results? Both in principle and in practice, according to NAVSUP WSS, the Navy's approach to these PBL arrangements is that they:

- are not "one size fits all"; each arrangement is tailored to the specific requirements of each program;
- are long-term arrangements;
- address availability, obsolescence/DMSMS, reliability, and cost;
- provide specified, measured performance outcomes;
- are supply contracts focused on a comprehensive performance package rather than individual parts;
- are enabled by the Navy Working Capital Fund (NWCF);
- are focused on a "win-win" strategy for the Navy and industry partners;
- incorporate surge capability;
- mitigate risk;
- contain exit strategies to maximize flexibility;
- incentivize industry product and process investment and innovation;
- are designed to be transparent to Fleet customers;
- seek to seamlessly integrate the product support strategy and the supply system.

The Navy's approach is designed to incentivize the right vendor behaviors and facilitate desired outcomes. When industry serves as a PSI or a PSP for a PBL arrangement, the use of fixed price "pay for performance" contracts motivates vendors to reduce both failures and consumption, while the long-term nature of the arrangement enables the vendor to

Figure 2. Naval Supply Systems Command PBL Profile Through Fiscal Year 2014



Source: Naval Supply Systems Command.

balance risks and investment decisions that lead to the desired outcomes. As a result, PSIs and PSPs are incentivized to improve parts support, optimize depot efficiency, invest in reliability and maintainability, and shortstop failures before they occur.

Not to say this is necessarily easy or simple. According to the Director of the NAVSUP WSS Supply Chain Solutions Division:

...affordability is often the greatest challenge associated with successfully implementing a PBL product support arrangement with an industry PSI. Crafting such an arrangement takes time. This challenge is not surprising as industry is taking on additional responsibilities under PBL, coupled with associated risks and costs which often do not exist in traditional support. In successful, affordable PBL arrangements, industry understands the risk/benefit proposition; costs associated with risk or additional efforts needed to meet performance requirements are offset by cost reductions possible through improvements and opportunities enabled by the PBL arrangement.

One might ask, "What about potential adverse impacts on public sector organizations?" In practice, Public-Private Partnerships serve as a fundamental element of the Navy's PBL strategies—with nearly 80 percent of NAVSUP WSS aviation fiscal year 2014 PBL obligations involving public-private partnerships. Navy PBL arrangements actually are designed to incorporate organic depot capabilities in to ensure compliance with 10 United States Code §2464 Core requirements. In addition, public-private partnering arrangements leverage organic fleet readiness center capabilities, infrastructure, and workforce expertise in tandem with industry.

The Performance-Based Logistics Awards Corridor in the Pentagon.

Photo by Alfredo Barraza,
U.S. Army



Sharing of best business practices, investments in reliability improvements and technology insertion is encouraged, all with an eye toward improving readiness while concurrently reducing costs. As implemented by the Navy in support of PBL product support arrangements, these Public-Private Partnerships are structured to:

- align industry and government along common goals;
- strategically combine the unparalleled depot artisan “touch labor” expertise and resident organic infrastructure with the engineering and supply chain efficiency of industry;
- strengthen the industrial base through collaboration with industry;
- facilitate improved organic depot efficiency, reduce support costs and optimize readiness.

Resulting performance outcomes, according to the Navy, over the last decade-plus speak for themselves. Examples include:

- Increased material availability
 - F/A-18 (Hornet fighter jet) Displays: 47 percent to 99 percent
 - AN/USC-38 Extremely High Frequency (EHF) Satellite Communications Program (SATCOM): 78 percent to 93 percent
- Decreased logistics response times
 - Aircraft Tires: 4 days worldwide
- Decreased repair turn-around times
 - F404 Engine: 25 percent reduction and 75 percent decrease in work-in-process

- Near-elimination of awaiting parts (AWP) problems
 - Auxiliary Power Unit (APU): 232 units AWP to 0
- Major reductions in back orders
 - F/A-18 Stores Management System: 489 to 0
 - NATO SEASPARROW Missile: 180 to 3
 - Close-In Weapon System (CIWS): 200 to 41
- Reduced logistics footprint
 - Retail allowance reductions: Tires decreased by two-thirds
 - \$7 million savings on ALR-67(v)3 Radar Warning Receiver initial outfitting

Why is all of this important? Simply put, as the Project Proof Point study cited earlier concluded, “PBL arrangements which substantially adhere to generally recognized PBL tenets reduce DoD cost per unit of performance while simultaneously driving up the absolute levels of system, sub-system, and major component readiness/availability when compared to non-PBL arrangements.” It is no wonder this important product support arrangement has been an integral DoD Better Buying Power initiative, and will continue to be in the coming years.

In an era of reduced budgets, sequestration, and fiscal uncertainty, cost saving, readiness-enhancing initiatives such as PBL should at the very least be compelling—and more appropriately, serve as an important tool for incentivizing desired weapon system outcomes in the toolkit of DoD program managers, product support managers, and life cycle logistics and other acquisition professionals throughout the DoD. &

The author can be contacted at bill.kobren@dau.mil.

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Source Selection Simulation

Intact Team Training
on Picking a Provider

Tom Elsesser ■ Bill Long



Our Defense Acquisition Workforce struggles with a shortage of employees skilled in source selection—the art or science of choosing a provider for a product or service. The significant lack of experience is due to the recent hiring of many new workforce members, and few of these have been through the highs and lows of essentially a sequestration while determining the most likely offeror. Col. (Brig. Gen. select) Cameron G. Holt, then serving as director of contracting for Air Force Life Cycle Management Center (AFLCMC/Contracting Organization) at Eglin Air Force Base in Florida, identified this concern and spoke with Defense Acquisition University (DAU) Professor Bill Long about ways to resolve this dilemma.

While he was developing contingency contracting training, Long came up with the idea of developing an interactive development platform. This would allow the team to develop from remote locations and also record the results in a DVD, to allow troops in remote locations access to Federal Acquisition Regulation (FAR), Defense Federal Acquisition Regulation Supplement (DFARS), policies, procedures, templates and

Elsesser and Long are professors of contracts at the Defense Acquisition University-South Region. Elsesser is program manager for the Source Selection Simulation and Long is program manager for the Acquisition Planning Strategy simulation.



examples. Troops would be able to practice with the DVD and then carry it with them on deployment, even to forward operating locations.

Holt said he thought the Air Force had enough source-selection training through its current Air Force Phase I/II Source Selection training but experience was still missing. It was understood that experience could not be "manufactured," but we realized we could manufacture a simulated experience. The intent would be to allow those about to enter a source selection to get a sense of the process, documentation and tasks experienced during a source selection so that, when faced with the real source selection, a sense of familiarity would allow for a steeper improvement curve—and, most important, an increased likelihood of success. The need for a simulation, to use Holt's analogy, was that "We would not put a pilot in the seat of a new \$100 million stealth fighter before giving her flight simulation time. The argument for source-selection simulation (SSS) training

is equally valid; before having people be responsible for a \$100 million source selection, give them some 'stick and throttle time' in the simulator."

From this, the idea of experiential training developed. We believe the most effective way to achieve experiential training is to have participants do what they will need to do in a source selection. Rather than present them the rules and policies about what they will be doing in a month or two, the concept is to have them *do* what they will be doing in a month or two. We believe that the best method to do so is through intact team training. This goes hand in hand with DAU's concept (stated in the Acquisition Learning Model) of interacting with acquisition workforce members at their jobsites.

Over the last year, DAU-South Region Contracting Professors Long and Tom Elsesser and Science, Engineering and Test Professor Ed Adkins developed a DAU Targeted Training Program for Source

Selection Mission Assistance. The professors interviewed many Air Armament (Eglin Air Force Base) acquisition professionals. In particular, they spoke with the Eglin AFL-CMC Acquisition Center of Excellence. These conversations were to identify, from the broad to the specific view, what outcomes the team would like to see. This was an important step, as we wanted to design a program that addressed specific goals rather than one that used previously developed material to meet minimal needs.

We asked a Source Selection Evaluation Board (SSEB) chairman and a procurement contracting officer who had recent source-selection experience, "What would you like to see from your employees as a result of participating in this simulation?"

Given the preferred outcomes of our sponsor, we were able to target our simulation around key events that participants needed to be aware of. The four-day simulation was designed to take a group from proposal receipt to contract award (and protest).

Before the simulation session, those scheduled to participate receive some information—primarily the RFP—which they are to review. Members walk in on the first day and immediately must surrender their cellphones and electronic devices, which lends a dose of reality to the experience.

While there is some presentation by the facilitators, most of the time is devoted to hands-on exercises.

The importance of writing evaluation notices crisply and concisely, the need for accurate documentation captured on a daily basis, and following a good plan were all reinforced.

They both responded that they believed that, if workforce members understood the importance of—and had some experience in—writing Evaluation Notices (ENs) and grasped the critical importance of proper documentation, source-selection efforts would be greatly improved.

With this guidance, we moved out to create a simulation we could conduct in a week's time. Trying to replicate a six- to 10-week event in four days was ambitious. We quickly realized we could neither cover every activity nor capture each event in depth.

Note that this is a simulation, not a workshop. We have a particular set of documents we use to conduct the simulation. The simulation is designed to familiarize participants with what they will be doing, not to conduct a dry run of the pending source selection. A primary concern was to avoid the perception of a dry run, which would invite a protest from the offerors who did not win in the simulation.

In practical terms, using the source-selection material for the simulation does not work. You likely will have the request for proposal (RFP), but you will not have offeror proposals that will provide the basis of the evaluation process. There are other drawbacks, but not having proposals eliminates the use of actual materials in any circumstance.

We can and do make adjustments to the simulation to mirror local practice—for example, in risk assessment. There are two methodologies for evaluating—combined or separate. We can build the simulation to either methodology.

On the first day we introduce ethics and organizational conflicts of interest. The key topic is a review of the proposals received and document findings on subfactor worksheets. The day closes with the team reviewing its work with the SSEB chairman.

On the second day, the participants write ENs to prepare an initial evaluation and competitive range briefing and present it to an independent review team. For the simulation, the facilitators serve in that review role. Again, we close the day with the team reviewing its work with the SSEB chairman.

On the third day, participants conduct discussions and evaluate offeror EN responses, and this activity includes evaluating the Final Proposal submission. Participants update subfactor worksheets and close the day, as always, with the team reviewing its work with the SSEB chairman.

The final day focuses on preparing and presenting the final decision brief to the Source Selection Authority (SSA). If possible, we have a local acquisition official serve as the SSA. This provides an additional dose of reality. We ask for insights after the briefing from the guest SSA and then debrief an unsuccessful offeror and, if time permits, a protest.

There are facilitator presentations throughout, but they are short and are used to remind participants of key points and desired outcomes of the exercise to follow. We also provide some time for participants to ask questions and discuss—but the intent is to create, as much as possible, a source-selection environment.

We start each day with a friendly competition between teams. The group is divided into three technical subfactor teams and we keep a running score each day and crown a champion the afternoon of the last day. The competition is based on topics exercised the previous day.

Even more dynamic is the creation of the SSS Tool. Drawing on his success in using a similar tool in contingency contracting, Long decided we should use a Web-based platform for presenting the simulation. Teaming with DAU Knowledge Project Officer Kathy Spainhower and DAU staff members Jennifer Zearley, Leesa Thomas and Brian Bohr, the group designed and built a training architecture under private workspace created on DAU's Acquisition Community Connection website. This training architecture created a way for the instructors to easily collaborate and share materials during the simulation development. This architecture also became the means of copying a mirror image of the training website onto a DVD for classroom delivery. The DVD provides students a "takeaway" tool that contains Department of Defense (DoD) and Service-specific policy and/or guidance, tools, templates and training.

At this point it became clear that what would be very valuable for our Eglin customer had broad application not only across the Air Force but throughout the DoD. So the tool development team included areas for each Service, to allow us to make available each Service's source-selection directives and guidance.

RFP for a 10-year multiple-award task order contract with an estimated value at \$19 billion. On Oct. 14-18, 2014, Elsesser led a DAU-West team consisting of Contracting Department Chairman Douglas Constant, Program Management Department Chairman James McNulty and Professor Salvatore Cianci through DAU's first SSS intact team training away from a DAU facility. DMEA brought 33 members to the SSS. Like the others, this SSS provided a realistic environment, immersing participants in activities necessary to effectively conduct their upcoming source selections. The importance of writing evaluation notices crisply and concisely, the need for accurate documentation captured on a daily basis, and following a good plan were all reinforced. Notable participant feedback included "very valuable"; "the exercises are realistic, showing what I can expect in the source selection"; "This is real!"; "The simulation gave me some great ideas"; "Great to do this with people I will be working with in the source selection."

Stemming from the SSS success, DAU-South is developing a prequel to the Source Selection Simulation. Realizing the battle often is won or lost before entering the Source Selection Facility, we are crafting a four-day Acquisition Planning Simulation. The Acquisition Planning Simulation will address acquisition planning activities leading up to release of the RFP. Tentative key focus areas include risk assessment, acquisition strategy and Section M evaluation criteria. This simulation will fill another gap in the learning process.



Realizing the battle often is won or lost before entering the Source Selection Facility, we are crafting a four-day Acquisition Planning Simulation.

So far, the development team has hosted successful pilots with DAU-South instructors and with Air Force and Army personnel. Feedback from each validated the training materials and tools on the DVD and identified areas for improving the efficiency and effectiveness in delivery of SSS intact team training.

On Sept. 30-Oct. 3, 2014, Professors Long and Elsesser delivered DAU's first-ever Intact Team SSS Training to Eglin's AFLCMC Professional, Engineering and Administrative Support Services (EPASS) Program Source Selection Team. The SSS intact team provided this 19-person EPASS source selection team "stick and throttle time" in the simulator to ensure improved acquisition outcomes for their five-year, \$50 million per year program.

Defense Microelectronics Activity's (DMEA) Advanced Technology Support Program team is preparing to release a draft

Again, there are many courses and manuals for doing these acquisition planning activities but little experience among members of the workforce. As with the SSS tool, we will partner with the DAU Knowledge Project team and use DAU's Acquisition Community Connection website as our platform. We hope to create a simulation that will give participants practical application in the various activities and documents of the planning process.

The team also is working on a Services scenario for the SSS as part of an ongoing fiscal year 2015 Mission Assistance project for Army Contracting Command. As time permits, we are making the current SSS tool more robust, with Service-specific tools, templates, training and source-selection policy websites. It is our intent to update material semiannually.

The authors can be contacted at thomas.elsesser@dau.mil and william.long@dau.mil.

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Integrating Intelligence and Acquisition to Meet Evolving Threats

Interview With Dr. Sean Kirkpatrick of the Defense Intelligence Agency

Brian Brodfuehrer

fforts to improve integration between the requirements community and the acquisition community must now be expanded by adding the intelligence community into that partnership. This is because how we design and employ our systems is heavily influenced by the threats we face. Increased globalization of communication and technology sharing has enabled those threats to become more significant and pervasive, a trend that is not likely to diminish. To stay ahead of that threat, in a cost-effective way, the Acquisition, Intelligence,

Brodfuehrer is a professor of program management at the Defense Acquisition University at Fort Belvoir, Virginia. **Dr. Kirkpatrick** is the Defense Intelligence Officer for Scientific and Technical Intelligence (DIO/S&TI). He is the DIA Director's and Deputy Director's senior advisor on the full scope of S&TI issues spanning analysis, collection, foreign liaison, counterintelligence, strategy and resources across the Defense Intelligence Enterprise.

and Requirements (AIR) communities must partner in new ways and rely on each other's strengths. This partnership or integration, must be present and active at each level in the Department of Defense (DoD) enterprise—from clear policy and governance down to program management and execution. At a minimum, we need to understand the threat and apply this understanding to drive our research, technology development, technology insertion, and existing program planned product improvements. Likewise, the intelligence community needs increased understanding of the requirements and acquisition demand for intelligence data necessary to build and operate weapon systems that are resilient and adaptable to this rapidly changing threat.

Near the end of last year, I interviewed Dr. Sean Kirkpatrick of the Defense Intelligence Agency (DIA) regarding partnership between the intelligence and acquisition communities. As Senior Scientific and Technical and Intelligence Advisor for the defense intelligence enterprise, Kirkpatrick evaluates what our adversaries are doing and projects what that means to the United States. He is also a level III program manager (PM) and has managed programs at the National Reconnaissance Office, the Air Force Research Laboratory and DIA.

My interview with Dr. Kirkpatrick highlights the importance of building a stronger partnership between the acquisition, requirements and intelligence communities to anticipate and plan for responsive and emerging threats. This partnership must leverage the best of what each community offers to stay ahead of the changing threat.

The following are highlights of that interview in question-and-answer (Q&A) format.

Q. Why is intelligence support to acquisition becoming a hot topic?

A. The United States is losing its technical advantage through globalization of technology markets, through black markets and through espionage. We are currently coming to a tipping point where our capabilities are in danger of being fielded after the adversary's countermeasures have been developed.

Q. What are key characteristics about the intelligence community that the acquisition community should understand?

A. Unlike physics, intelligence is not an exact science. But, like systems engineering, there is a lot of art and science mixed together. The intelligence community can be thought of as a group of specialists and a group of generalists. The specialists might focus on a type of weapons system or a region in the world or on signals intelligence. The generalists or the "All Source Analysts" bring that all together and provide a complete picture to the policy makers and to PMs. The "All Source Analysis" is more robust and it takes longer to generate. What the acquisition community needs to understand is that the question you ask, the way you ask it, and who you ask it of

Policy Change on Who Requires Use of Critical Intelligence Parameters (CIPs)

We have drafted policy language that Defense Acquisition, Technology, and Logistics now is coordinating that will make it a requirement for at least Acquisition Category I programs to identify CIPs early and for the intelligence community to monitor those and report breaches throughout the life cycle, especially before major decision points such as Defense Acquisition Boards.

affect the answer you get. So if you ask the question of a single source analyst, you get a single source answer. And if you ask the question of an "All Source Analyst," you are going to get an all source answer, and it will take longer. Not knowing this sometimes leads to misunderstanding on the acquisition side about why I am getting different answers.

Q. What tensions have you experienced and how would you suggest those be managed?

A. There is a constant tension between the intelligence community and the acquisition community, and it is based on time and certainty. The acquisition and requirements communities want to know what the threat baseline is so they can design their missions or Analysis of Alternatives and then build a capability. They want to know, at a certain time, with certainty, what the threat is. Once they get that answer, they often tell the intelligence community, "Go away, leave us alone and we will see you at the next milestone." What PMs often forget is that it is not about the next milestone; it is about building a capability that will have to win in a rapidly changing threat environment. The threat is changing fast and our acquisition cycle needs to adapt quickly. That can be frustrating to PMs who already have a very difficult chore of making a program executable even with a fixed baseline. The PM must have a constant awareness of what is evolving to avoid the system from becoming irrelevant. And, as we will discuss later, we must adopt more agile acquisition approaches around critical intelligence parameters to account for threat changes.

Q. Where in the life cycle, traditionally, is the intelligence community touching base with the acquisition community?

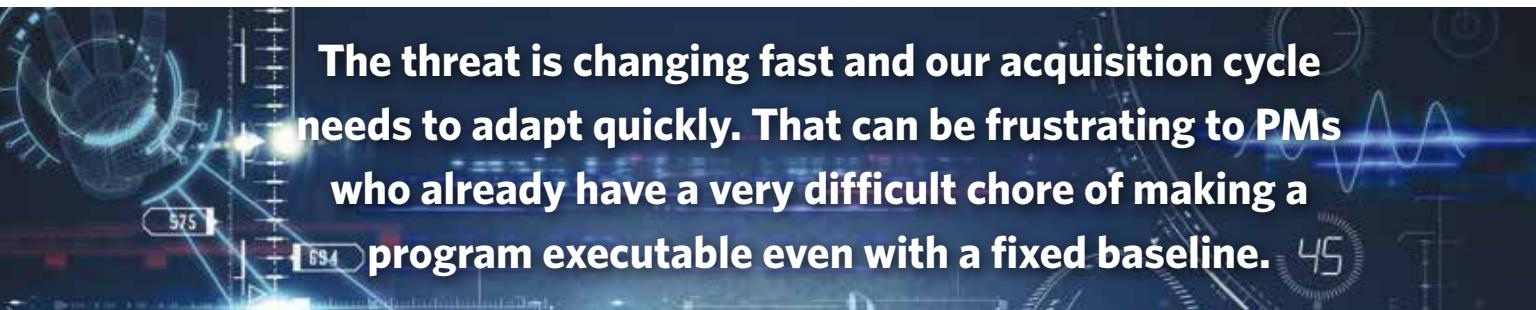
A. This is something we are trying to change. In previous versions of the DoD Instruction 5000.02, the PMs would get a threat document, they would design to that and they would have to have it updated at their milestone decisions. If the threat changed between the milestone decisions, how likely were the program offices to change any of their system design? They may make note of it and address it in a block upgrade. That, historically, has been an issue. What we are trying to get across in the updated 5000.02 is that the program office should maintain a constant connection with the intelligence community through a liaison officer. That connection

would provide updated threat baseline information as part of every major product development decision point; for example, Systems Requirement Review, Preliminary Design Review or Critical Design Review. A goal is to get information from the intelligence community and include that in the list of things that influence design decisions at those key product development points.

In addition, the acquisition community and PMs need to think early on about what information they need from the intelligence community at different product development points. As the design matures, a greater level of threat specificity will be needed. Also, the farther to the left of bang you are looking in the adversaries' kill chains, the harder it is to get intelligence. Being able to write down what is needed and when is important. That is the kind of information that is put in an AISA or Acquisition Intelligence Supportability Agreement. This AISA concept is being piloted right now where the acquisition community identifies what information is needed at each phase of the life cycle, and the intelligence community signs up to provide it. It is kind of a contract between the PM and the intelligence community. In summary, the concept is that there are different levels of intelligence community

the shelf. It usually takes about two years to generate a STAR and get it validated by DIA, and by the time the PM gets it the threat has evolved.

The current process is also inefficient for the intelligence community; it takes two years and a handful of analysts an inordinate amount of time to pull the data together, to analyze it, write it down, get it validated and communicate it out, for many different programs. They are wasting weeks of man-hours documenting all this, which is not doing analysis. We are trying to change the dynamic and pull the intelligence community into the 21st century and get rid of hardbound documents that have limited value. We envision providing an actual multimedia environment that is fully dynamically linked to finished intelligence, to an integrated concept of operations and to threat models. Program offices will be able to grab these intelligence community validated models and use them in their own designs with different levels of fidelity going from early on to test-data-based models. This digital environment is important because analysts then could spend the bulk of their time doing analysis, and the collectors doing collection and not updating hard-copy documents. If a threat changes, the analyst would populate the data base online and update the whole digital



The threat is changing fast and our acquisition cycle needs to adapt quickly. That can be frustrating to PMs who already have a very difficult chore of making a program executable even with a fixed baseline.

assessment specificity, and matching the level of specificity to the phase of the life cycle is a way to marry up what the intelligence community produces with what the acquisition community needs.

Q. What changes do you see coming in the intelligence community that the acquisition community needs to know about?

A. A number of intelligence support changes are coming. Two important ones are the Critical Intelligence Parameters (CIPs) policy and the change to the System Threat Assessment Report (STAR). Let me start with the STAR: Every system has to have one. Historically, it has been a hard-copy document and has been a snapshot of the threats in a given area of operation. It can range in length from tens to hundreds of pages. If you were to survey the PMs in your next class, I think they would tell you they have been of moderate to low use to them.

Q. Why is STAR of moderate use to PMs?

A. It is a report they have to get, they will read part of it, they are certainly not going to read 600 pages of it, and it goes on

dynamic threat baseline, now called the Validated Online Life-cycle Threat or VOLT. The program management office would then get notified if that change is important to them. A PM, government or industry, would much rather get that information when in a flexible trade space than three weeks before the milestone update.

Q. How will PMs know what information they really need to pay attention to? They have a lot of data to cull through. How do they sort the wheat from the chaff?

A. This gets to the second main change. CIPs are vitally important to that. Most PMs don't know what those are. A way to understand a CIP is to think about the adversary developing a capability to neutralize your capability. What key features (parameters) would that system have? Those are the CIPs. What would be its thresholds and objectives? Those would be the particular levels a parameter would need to achieve to be of concern. Those are the things the acquisition community asks the intelligence community to watch and report on. Perhaps a parameter could be detectability. If the adversary can detect a certain level of signal, then that capability becomes an existential threat to your capability and to your mission. The

intelligence community needs to let the acquisition community know when that is in danger of happening.

The beauty of CIPs is that the PMs own them. The PM has to identify them early on, and do so in partnership with the intelligence community. It is not everything—just those things that can put your mission at risk. Whatever threat parameter is really important to your ability to conduct your mission and to your capability, we would call a CIP. It is up to the program management office to work with the intelligence community as early as possible to identify those. The acquisition community identifies those early and links them to the VOLT, which flags the intelligence community that these are important and if they change we want to know about it. You can set thresholds and objectives like you do on the acquisition side with Key Performance Parameters. This approach will allow the intelligence community to be more efficient in collection and analysis. Some CIPs will be the same for multiple programs. One threat change could, through the VOLT, flag several programs automatically and when it happens versus one at a time through a hard-copy document around milestone updates.

On the acquisition community side, this has powerful impacts.

The CIPs tell product developers which parameters, if the adversary reaches certain limits, the mission effectiveness of the system will diminish. From a systems engineering perspective, wouldn't I want to design some flexibility around the components that are impacted by these parameters? For example, could I design a modular or upgradable frequency band in a transmission that is supposed to be undetectable?

Another positive thing is that this could reduce the cost of acquisition by not requiring large design margins to account for unknown threat changes. My experience with product design is that, if you don't have a good understanding of where the threat might go, you put in a large design margin to cover yourself. That design margin costs money and can also reduce system performance in other areas. If you knew that you would be watching the threat as the design evolved and that you could upgrade or evolve as required, then you would not have to build in a large design margin early on. This also could avoid expensive technology development to meet a design margin that may or may not be required. The design around the CIP items should be done so that it can be changed in an agile or flexible way, perhaps using a modular open systems architecture approach.

Q. Why do the acquisition community and intelligence community need to be more linked in the future?

A. Fifth-generation weapons systems increasingly rely on intelligence mission data (IMD) to provide their capability. Examples might be overhead intelligence, order of battle information or signatures. PMs need to be aware that if you design the world's most advanced weapon and it requires intelligence mission data to do it, then the intelligence community must be

The Program Manager and the Intelligence Community: Major Things to Know

- Identify an intelligence liaison officer.
- Request an in-depth briefing on both the threat baseline and on the CIPs for the program.
- Determine if your program is working off a Validated Online Life-cycle Threat (VOLT) or off of a System Threat Assessment Report.
- Get involved with the digital threat assessment pilots.

prepared to provide that data. The PM must realize the load that is being placed on the intelligence community and that the requirement for IMD is handing a bill to the intelligence community that may not be currently funded. PMs need to think about what you are counting on from the IC. Do you have an agreement? We must avoid the acquisition community building a system that relies on data that cannot be provided in a timely fashion by the intelligence community. The acquisition community and the intelligence community must increase their collaboration and integration in a much different way to do so. That philosophy extends up the Under Secretary for Acquisition, Technology, and Logistics, Frank Kendall, and he clearly understands that.

Q. Is there anything else you would like to add?

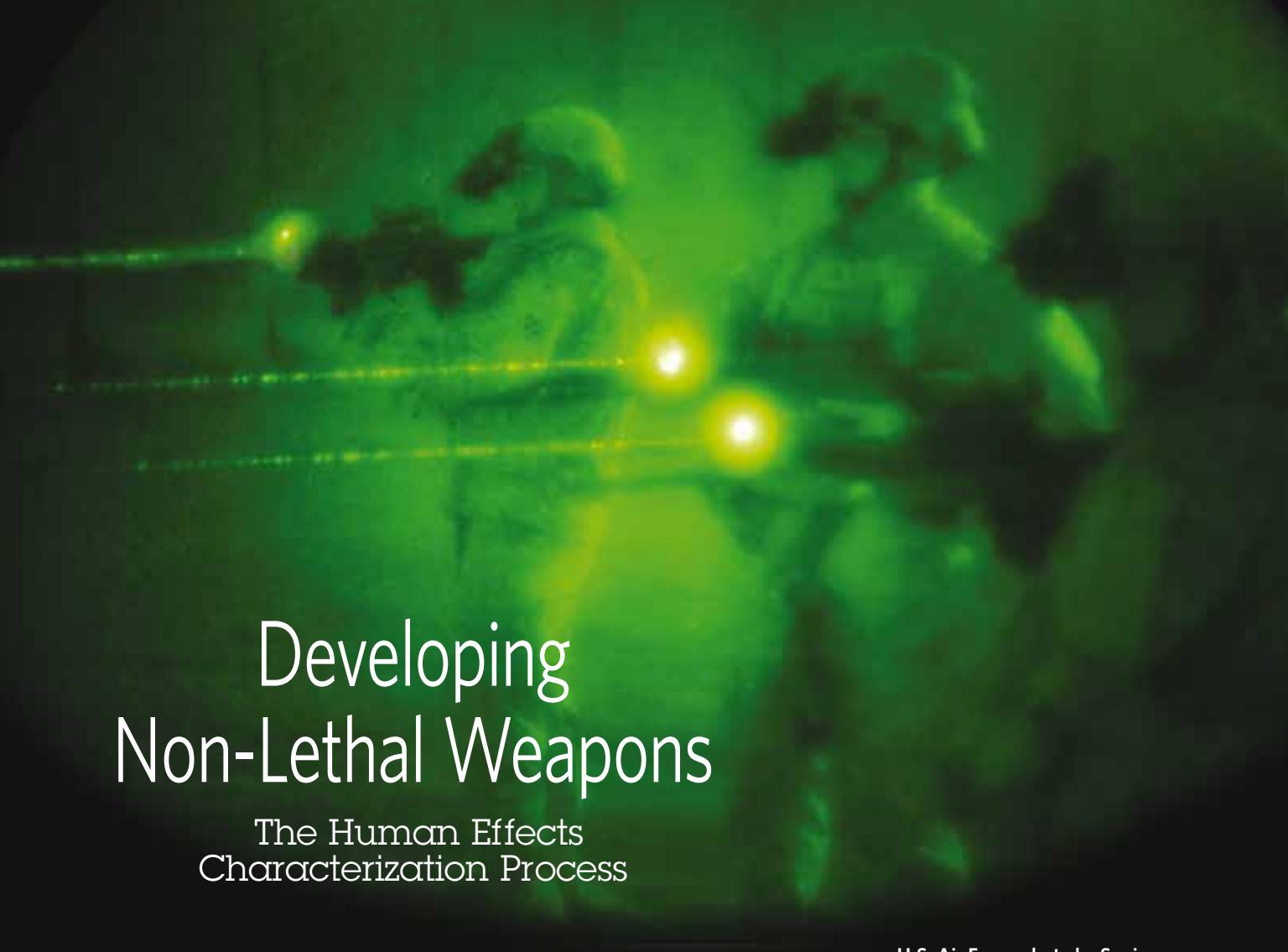
A. The only thing I would emphasize is the need for the dialogue, early and often. Have an intelligence liaison integrated with your program management office team. Understand the cultural divide and understand what information needs to be gathered to affect the acquisition program. Right now we are trying to address improvements in the acquisition cycle up to the Milestone Decision Authority. Going into a major milestone, programs will be asked three questions: Have you updated your threat baseline, have the CIPs been breached and have all your intelligence mission data been collected?

The acquisition community and PMs need to understand that there is a cost associated with intelligence. If you are trying to design a system that can defeat an adversary left of bang in the kill chain, then that requires a higher fidelity of intelligence. The farther left you go, the greater the amount of intelligence required to understand vulnerabilities. This costs more. The PMs need to keep that in mind. It gets back to asking, "Am I designing a weapons system that requires intelligence that may be unsupportable?"

There is a need to develop regular dialogue between the acquisition community and intelligence community so that the United States can respond to emerging threats in a cost-effective way. The continued dialogue could reduce cost on both sides.



The author can be contacted at brian.brodfuehrer@dau.mil.



Developing Non-Lethal Weapons

The Human Effects
Characterization Process

*Wesley A. Burgei ■ Shannon E. Foley
Lt. Col. Scott M. McKim, USAF*

**U.S. Air Force photo by Senior
Airman Michael Wykes**

Armed only with lethal force, and facing vehicles that didn't stop, U.S. warfighters manning a checkpoint in Iraq were left with a difficult choice—engagement with lethal force against an unknown entity or risk being attacked. Tragically, some drivers didn't comprehend warnings.

To help resolve this dilemma, warfighters were equipped with non-lethal weapons, including a dazzling laser that got drivers' attention and indicated a need to stop. Using these capabilities helped differentiate combatants and noncombatants and reduced checkpoint shootings.

Non-lethal weapons are needed where conflict and disasters occur within population centers. They fill the space between "shouting and shooting" and their use often has prevented the worsening of bad situations. Non-lethal weapons like blunt-impact rounds, pepper spray and others stopped and/or dispersed noncombatants who posed a threat to forces in Kosovo, Iraq, Haiti and Afghanistan. They also helped determine the intentions of

Burgei and Foley are human effects scientists assigned to the Joint Non-Lethal Weapons Directorate, Human Effects Office. **McKim** is the Human Effects Officer at the Joint Non-Lethal Weapons Directorate at the Marine Corps Base at Quantico, Virginia.

operators of small boats that were nearing U.S. Navy and Coast Guard vessels.

As these examples highlight, non-lethal weapons provide options to commanders on the escalation and de-escalation of force continuum, enhancing their capability sets in various environments. While the benefit of these options maybe seem self-evident, it may not be as obvious how the Department of Defense (DoD) defines a non-lethal weapon and procures systems which meet that definition.

The need for non-lethal weapons was recognized with the 1996 establishment of the DoD Non-Lethal Weapons Program. This followed the asymmetric warfare experience in Somalia. Here, rock- and Molotov-cocktail-throwing crowds and open looting of military equipment were undeterred until U.S. forces adopted non-lethal weapons during the 1995 United Nations withdrawal from Somalia.

Though their use was limited, U.S. forces made these non-lethal capabilities known to the Somali population in advance,

DoD Directive 3000.03E, DoD Executive Agent for Non-Lethal Weapons and Non-Lethal Weapons Policy, defines non-lethal weapons as:

Weapons, devices, and munitions that are explicitly designed and primarily employed to incapacitate targeted personnel or materiel immediately, while minimizing fatalities, permanent injury to personnel, and undesired damage to property in the target area or environment. NLW [non-lethal weapons] are intended to have reversible effects on personnel and materiel.

The directive also states it is DoD policy that:

Developers of NLW will conduct a thorough human effects characterization in accordance with DoD Instruction (DoDI) 3200.19 to help understand the full range of effects and limitations prior to operational employment of the NLW.

In effect, development and acquisition must include a process, unique to non-lethal weapons, which accounts for the effects of the system on human targets. It is important to note that



For non-lethal weapons, human effects may be the most constraining attribute. The feasibility of delivering a human effect at desired ranges is good for many systems; however, doing so may incur great risk of inflicting injuries.

deterring hostile crowds who initially were bent on "driving the Americans back into the sea."

Since then, this program has sought to facilitate development and fielding of non-lethal weapons to meet U.S. forces' requirements. And, by 2011, needs had grown to the point that then-Assistant Commandant of the Marine Corps Gen. Joseph Dunford stated, "The demand for non-lethal weapons exceeds the inventory," as reported by the *Marine Corps Times*.

What Is Non-lethality in DoD?

"Non-lethal" means something that produces more nuanced effects to achieve a given purpose. For countering personnel, examples of non-lethal effects include electromuscular incapacitation that disables, glaring light that obscures vision, and millimeter wave energy that heats nerve endings, repelling individuals. The term "non-lethal" is subject to varying interpretations—and, while examples help elicit the scope of effects included in the non-lethal spectrum, the topic is defined more clearly by DoD policy.

while human effects on the target must be characterized for non-lethal weapons, they are not required to have a zero probability of producing adverse effects.

Instead, the human effects on the target are an inherent attribute that will influence heavily the design of any non-lethal weapons system: Achieving the desired effectiveness with an acceptable injury risk often is the crux of their development. From the onset, programs should incorporate human effects into their overall risk management approach similar to other aspects of the development. In fact, DoDI 3200.19, Non-Lethal Weapons Human Effects Characterization, published in 2012, requires the human effects of a required non-lethal capability be designated as a Key Performance Parameter (KPP) or Key System Attribute (KSA).

Characterizing Human Effects in Non-Lethal Weapons Acquisition

Whether forces are rapidly fielding commercial off-the-shelf (COTS) items or addressing a capability gap with a

development program of record, characterizing the human effects in non-lethal weapons acquisition is critical to the warfighters who face complex engagement scenarios. The warfighters must have confidence in the effectiveness of a non-lethal weapon and understand the risk of adverse effects. This need was identified early in the Non-Lethal Weapons Program. The human effects characterization process has since matured and is one of the aspects of non-lethal weapons acquisitions that make it unique from other weapons.

In some cases, non-lethal weapons have been rapidly developed and/or fielded to meet urgent warfighting needs. These efforts have been informed by the DoD

Non-Lethal Weapons Program, quickly drawing on experts and past research. Such was the case with dazzling lasers, urgently needed in Iraq and Afghanistan. Experts from the Air Force Research Laboratory, Naval Surface Warfare Center Dahlgren, and the Army's Communications-Electronics Research, Development and Engineering Center collectively assessed considerable research on lasers' ocular effects. They determined factors impacting effectiveness and injury risks, thereby informing laser use and future development.

For programs of record, the process starts with a capability requirement defined by combat developers—driven by the needs of our warfighters. As with other acquisitions, the definition of requirements is critical to a program's success.. Here, requirements must be written in terms of the consequences for a human target both for effectiveness and risk. This, therefore, demands early involvement of subject-matter experts on non-lethal weapons human effects.

The importance is amplified when one considers that, for non-lethal weapons, human effects may be the most constraining attribute. The feasibility of delivering a human effect at desired ranges is good for many systems. However, doing so may incur great risk of inflicting injuries. Thus, in designing non-lethal weapons, trade-offs often are necessary between the weapons' effectiveness and the risks of injuries. Adding to this complexity, consideration must be given to testing a system prototype against a new human effects capability requirement.

The importance of insightful and clear requirement definition cannot be overstated. Here is an example of considerations for a non-lethal, counter-personnel capability, which will heavily influence system design:



A screen shot of a human effect computer modeling tool for non-lethal weapons
Department of Defense photo illustration.

- **Task:** Is the non-lethal capability intended to deny individuals access to areas, move them from areas, disable and/or render them unable to perform, or suppress and/or reduce performance? This addresses the system's desired effect on a target's behavior and how it enables mission accomplishment. However, a measurable requirement for behavioral effectiveness is difficult to define. In the past, human effects experts necessarily have interpreted and defined these desired effects in terms of the more measurable physiological effects of the stimulus caused by the system.

- **Conditions:** These include the intended domain for the capability—land, air or maritime; types of weather—day and/or night; open or confined spaces; involvement of one or several targeted persons; and whether these persons are moving. Conditions can have significant effects on a system's performance—for example, the glare effects of dazzling lasers and flash bangs are highly variable depending on ambient lighting.

- **Parameters:** What is the desired range to targeted personnel? Is the target a point or area? What is the duration of the effect? How long should reversal take?

After defining a requirement, it may be found that a 40-millimeter projectile is deliverable to a needed range beyond 100 meters—but could inflict unacceptable injuries, thus necessitating design modifications and/or trade-offs. Also, well-defined non-lethal capability requirements may drive applied research. For example, technically it is possible to achieve extended human electromuscular incapacitation (effects similar to those caused by TASER devices used by law enforcement). However, confidence must be assessed about



A U.S. soldier signals for an incoming vehicle to halt. If the vehicle does not stop, dazzling lasers that disrupt the driver's vision may provide a non-lethal way to enforce the order without firing a shot.

Department of Defense photograph.

the ability to incapacitate targets for longer than 15 seconds with acceptable risk.

Defining a requirement for a non-lethal capability also includes determining an acceptable Risk of Significant Injuries (RSI). This is the DoD-defined metric to measure the non-lethality of a weapon system. Warfighters, through combat developers, determine this risk based on a concept of operations for a non-lethal capability. DoDI 3200.19 defines significant injuries as those that result from proper employment and require health care beyond the field or self-aid, permanent functional impairments, and fatalities. It is often expressed as a percentage, such as a 5 percent probability of significant injury at defined ranges. This determination is deliberative, driven by the intended mission use, and informed by human-effects experts. Risk of Significant Injuries is, therefore, the build-to DoD specification for non-lethality. Describing the trade space between risk of significant injuries and effectiveness is paramount in non-lethal weapons development.

An example of user requirements may be to hail and warn individuals, and also temporarily suppress vision. Translated into a measurable human effect, the requirement may call for specific irradiance levels at ranges, which vary depending on the desired effect and distance. The human effects role continues throughout the acquisition process and should be integrated fully into the system engineering process to ensure informed characterization planning, prioritization and programmatic risk management.

The DoD Non-Lethal Weapons Program, Human Effects Office, manages a portfolio of science and technology efforts to understand the relevant human impacts of emerging tech-

nologies in terms of their effectiveness and risk. Examples of such efforts include examining novel stimuli for applicable effects, determining stimuli doses for achieving those effects, and developing a framework for assessing behavioral effectiveness. The results of these efforts establish the human impacts of these technologies in terms of their effectiveness and risks and contribute to the development of models and surrogates for testing.

Robust engagement between materiel and combat developers, testers and human effects personnel ensures integration of technology development, human effects and test and evaluation plans and investment strategies—managing cost, schedule and technical risk due to human effects characterization.

Meeting the DoD Definition of Non-Lethal

Within the DoD acquisition system, non-lethal weapons are treated the same as other weapons programs, with the addition of a target human effects review. DoDI 3200.19 requires non-lethal acquisition programs to undergo this independent DoD review, called a Human Effects Review Board (HERB). The board provides Non-Lethal Weapons Program Managers and Milestone Decision Authorities with:

- An assessment of the quality and completeness of human effects information
- Potential human effects risks
- Recommendations to mitigate these risks

The HERB consists of representatives from the Surgeon General and safety offices of the military Services (including the Marine Corps' medical officer), U.S. Special Operations

Command and U.S. Coast Guard. The DoD Instruction states that "... the HERB review ensures human effects of NLWs are evaluated consistently."

In addition to the HERB, from the early phases of materiel development onward, the DoD Non-Lethal Weapons Program identifies technologies or systems to undergo independent scientific assessment by Human Effects Advisory Panels. These panels consist of scientific experts from industry, academia and government who review the current state of a human effects characterization effort, offering a critical peer review of the available research data, models and research plans. Such a review can shape and validate the human effects characterization and technology development going forward.

Ultimately, human effects characterization and peer review processes provide decision makers, commanders and users with confidence that the system will work as intended—and a firm understanding of the risk of employing it. They also may inform legal and policy reviews, development of rules of engagement governing non-lethal weapons use, and contribute to training on non-lethal weapons.

Conclusion

In 2014, a U.S. Marine convoy in southwest Afghanistan encountered more than a dozen, rock-throwing locals. After a Marine fired a 12-gauge, non-lethal warning munition, the

rock throwers fled. Similarly, in eastern Afghanistan, a U.S. Air Force security patrol observed local people attempting to cut concertina wire on the perimeter of a U.S. base. When the locals persisted after visual warnings to stop and leave, the patrol initiated two non-lethal, sting-ball grenades, causing the intruders to flee, evidently unharmed. Had the Marines or Airmen been equipped only to respond with lethal force, the engagements and/or their abilities to accomplish the mission might have been changed.

Non-lethal weapons provide commanders options for escalation and de-escalation of force, making them more effective in similar situations that arise almost daily in typical recent operations.

The characterization of non-lethal weapons human effects has become more defined and advanced, building on knowledge and lessons learned. Today, it is guiding non-lethal weapons development in its earliest stages, focused first and foremost on warfighter needs as expressed by combat developers. And this human effects characterization is informing development of far more sophisticated non-lethal technologies needed by warfighters today and needed even more tomorrow. This continually improving human effects characterization process is key to improving non-lethal weapons. &

The authors can be contacted through kelly.hughes@usmc.mil.

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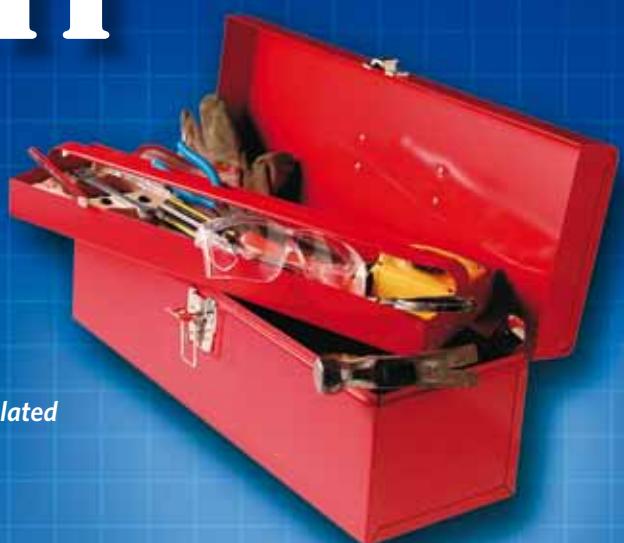
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The Fast Follower

Coming Up Behind
Development Leaders

David Pearson



Let's face it: In many technical domains, the Department of Defense (DoD) no longer is the world's leader.

DoD often finds itself on the outside looking in at many of the latest technical advances after losing its place as the dominant tech customer. DoD faces a shrinking defense industrial base and a more global tech marketplace and competes with the rise of consumer electronics that have short product life cycles.

Since the end of World War II, the United States has relied greatly upon technical solutions to fight and win across the battle space. In view of our current shrinking defense budgets, the rise of competitors that possess keen technical proficiency and the globalization of the world's tech base, how does the DoD maintain its historic technical competitive advantage?

For some technical domains, it may be time to consider alternative strategies in researching, developing and fielding the latest technical capabilities. One approach is to adopt the fast-follower strategy.

The Perils of Being First

Consider the first pioneers and explorers. After years seeking government or royal patronage, the trailblazers mounted expensive expeditions of men, ships, wagons, etc., and set off on an uncharted course in search of a vaguely defined goal. After enduring great risk, expense and hardship they regularly fell far short of their objective—face down with arrows in their backs or adrift in a sea of ice, gnawing on their leather belts.

In exploring for new technical solutions, researchers spend a great deal of time seeking sponsorship, building specialized infrastructure and, after years (or decades) of repeated failure and risk, may or may not have developed

Pearson is the director of the Engineering and Technology Center at the Defense Acquisition University at Fort Belvoir, Virginia.

a technology that will add capability to our warfighters. They also frequently are challenged to calculate and justify the return on their sponsor's investment.

In the commercial technical marketplace, this tale also is common. Alta Vista, not Google, was credited with creating the first search engine; yet few people conduct online searches today with Alta Vista. Finally, research shows that "first movers" have a 47 percent failure rate, while the fast followers fail only 8 percent of the time.

What Is a Fast Follower?

Traditional DoD research and development (R&D) works its way through a well-defined process. It starts with basic research, works its way through applied research and then advanced technical development before, hopefully, spinning out usable technical capability—sometimes decades later.

In contrast, our fast follower has its own version of R&D, replacing research and development with "replicate and duplicate." The fast follower leaves all the experimentation, risk and failure to others and positions itself to rapidly exploit the newly discovered technical knowledge by quickly applying that knowledge to the unique needs of its customers. The fast follower allows the pioneer to make the big investments, endure countless failures, navigate the uncertainties and assume much of the technical risk. Rather than discover and mature science and technology, the fast follower leverages the work of others and gains competitive advantage by finding unique innovative applications of these leading-edge technologies to solve problems for its customers. Like the stock-car racer, the fast follower drafts behind the first mover, allowing the lead car to absorb all the resistance while conserving its own resources. Then, when the conditions are right, all that potential energy is released and the fast follower is able to break through and slingshot ahead of the lead.

With DoD's technical leadership eroded in many domains and pressure on R&D budgets, we have to consider fast-follower strategies to position ourselves to quickly innovate around the technical developments of others.

Fast-Follower Attributes

The fast follower is aggressively vigilant in its technical awareness, organized for speed in innovation and has an intimate knowledge of its customer. From its vantage point on the first mover's rear bumper, the fast follower can see where the technology is going. The fast follower is able to see how the leader navigates the course and can assess the risks and project the probability of success.

The fast follower must swivel and use peripheral vision to judge the progress of competing technical alternatives. Extending the metaphor beyond the race track, our fast follower is immersed in the latest research through partnerships with academia, industry and high-tech start-ups, participation in refereeing technical journals and active leadership in profes-

sional societies and technical conferences. Our fast follower needs to stand on the leading edge of technology but does not have to be the one that built it.

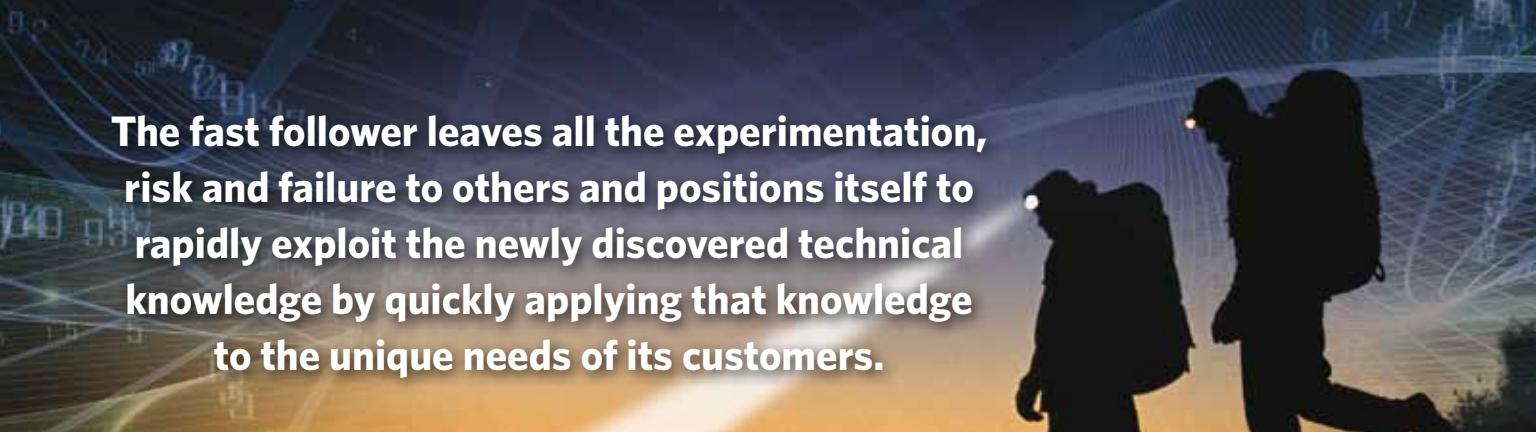
Second, the fast follower must organize and develop processes that allow it to win the innovation race. A risk of relying upon technology developed by others is that this technology is available to many potential adversaries. You are competing not only against the developer of the technology but also with other fast followers. Consequently, the fast follower's competitive advantage derives not from having the latest technology but being able to rapidly innovate and quickly apply that technology to the battlefield—giving the warfighter the advantage needed to prevail. The advantage goes to the organization whose product development processes can best and most quickly fit the technology to the needs of the warfighter. With reliance upon others for leading edge technology, our defense acquisition system's innovation cycle must be faster than that of our competitors. The fast follower is not competing on technology but on speed of innovation.

Third, fast followers need to view themselves as technology stewards for the warfighters. The fast follower must have an intimate knowledge of the warfighter's environment, challenges, concepts of operations and projected threats to rapidly steer emerging technology to counter the pain points of the warfighter or to exploit opportunities. A unique cadre of innovators is needed with sufficient understanding of the technology available and a deep commitment to knowing the technology requirements of the warfighters. The fast mover must out-innovate its adversary by rapidly deploying leading-edge technology, assuring sustained technical competitive advantage to the warfighter.

Strategy for Technical Risk Management

A benefit of the fast-follower strategy is that much of the technical risk involved in technical discovery is borne by the first mover. Our fast follower watches closely the commitments of money, human capital, time and infrastructure that the technical pioneer gambles on the pursuit. However, the fast follower must be equally adept at managing technical risk, particularly those risks associated with technologies deeper in the technology diffusion cycle. Deciding which technologies to follow and when to engage are critical and must be informed by adroit technical risk management.

A fast follower's technical risk management toolbox should include various technological forecasting methods. Through reliable technical forecasting, the fast follower can dissipate the fog of uncertainty and make better decisions on what technology to follow and when to engage. Technical forecasting techniques vary in rigor and quantitative analysis and include Delphi methods, Growth Curve Forecasting, Analytical Hierarchy Process and trend analysis. The availability/validity of data, the number of variables associated with a technology's development, availability of funding and the similarity between proposed and existing technologies



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should be considered in selecting from the variety of forecasting tools available.

It is important that these forecasting techniques can be used to turn risk management into opportunity management. With reliable data based technical forecasts, the fast follower can pick the optimal time to engage and balance the risk and opportunities offered by emerging technologies.

Finally, as a technology innovator rather than a technology discoverer, the fast follower can concentrate on maturing its innovation processes. With a mature and shorter innovation cycle, the fast follower can lower its technical risk even further because it can afford the luxury of allowing the technology to mature a bit longer before making a commitment to that technology. The speed of an effective innovation cycle should make up for any time lost waiting for the technology to mature to an acceptable level of risk.

You Make the Call ...

Consider a simplified example that stitches these ideas together: the alternate fuel vehicle. Driven by high fuel prices and sensitivities to climate change, the global commercial automobile industry is running hard to develop the next power source for automobiles. Tesla Motors is laying down huge bets on all electric vehicles, recently making a commitment to build a \$5 billion "gigafactory." This plant would be the world's largest and most advanced battery factory with a goal of producing enough batteries for 500,000 electric cars by 2020. Toyota is pursuing an alternate technology with the Fuel Cell Electric Vehicle, relying upon stored hydrogen and oxygen to electro-mechanically react to generate electricity for a car. Toyota introduced its fuel-cell-powered Mirai in California in November 2014. And, to facilitate a broader diffusion of these technologies, both Tesla and Toyota are making their patents and other intellectual property available free of charge. Other automobile manufacturers are minimizing their risk by rolling out hybrids and adopting a wait-and-see approach.

Meanwhile, the DoD continues to rely upon the diesel engine as its power source for most land vehicles. The DoD has long recognized the vast amount it pays for fuel, and over the past decade has come to more fully appreciate the operational imperative of reducing reliance on traditional sources of fuel. The DoD has even developed its own acronym for this—FBCE, or the Fully Burdened Cost of Energy. Finally, while all this plays

out, recent declines in oil prices may crush a key assumption and perhaps remove a key incentive for these alternatively powered vehicles, at least for the near term

With this background, what should the DoD's approach be to powering the next generation of land vehicles?

Should we stick with what we know and concentrate on improving the efficiency of current technologies?

Should we launch (at great expense and risk) our own R&D program to research, identify, develop, mature and field new alternate fuel technologies for land vehicles?

Should the DoD adopt a fast-follower strategy, leveraging what the commercial sector already has learned and avoid the risk and expense? Much of the intellectual property is there free for the asking.

If we did commit to the fast-follower strategy, how would we monitor technical developments, assess our risks and evaluate opportunities?

Which technology would we commit to and how would we know when to commit to it?

And do we have the organization and innovation processes in place that can rapidly deliver this technology and provide our warfighters a technical advantage on the battlefield?

In December 2014, the Joint Light Tactical Vehicle Joint Program Office issued a request for proposal to begin low-rate production on a new class of 50,000 vehicles for the Army and Marine Corps. The vehicles will be powered by diesel engines.

Summary

In many domains, the DoD no longer is the technology trail-blazer, nor can it afford to be. DoD acquisition organizations should consider a fast-follower strategy based upon aggressive technical awareness, technology forecasting techniques, adroit technical risk management and rapid innovation. The fast follower's competitive advantage comes not from having the latest technology but from the ability to rapidly innovate and quickly apply that technology to the battlefield and give the warfighter the advantage needed to prevail.

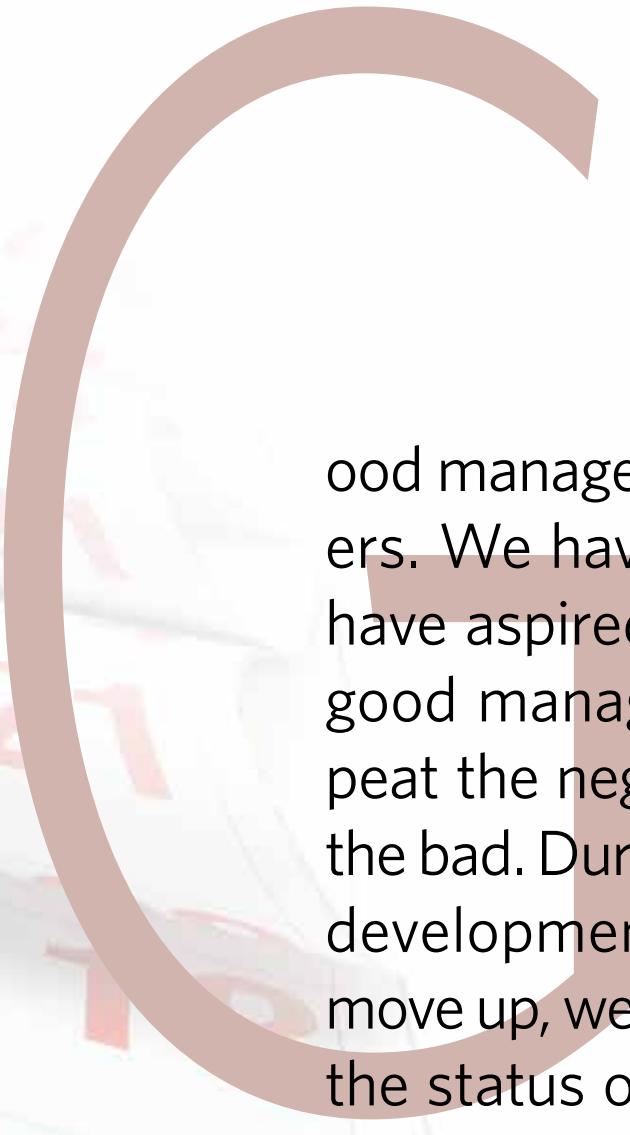
The author can be contacted at david.pearson@dau.mil.

The First 100 Days

of an Acquisition Workforce Manager

Michael Cook





ood managers and bad managers. We have all had both and have aspired to learn from the good managers and never repeat the negative influences of the bad. During our professional development, if we excel and move up, we one day may attain the status of “manager of others.” Some new managers within the acquisition workforce benefit from formal training and mentorship programs, while others

Cook works at the 412th Range Squadron at Edwards Air Force Base in California. He is Project Management Professional certified with a master's degree from the University of Management and Technology in Arlington, Virginia.

do not. Regardless of the path taken to the title, success evolves from one's plan.

Success is not an accident. It is earned through planning, hard work and the attainment of goals. The focus of this article is to relay the importance of a formal plan laying out a new manager's first 100 days on the job within the acquisition workforce. It discusses steps to take in achieving milestones within the first 100 days as well as pitfalls to avoid.

The Challenge

As in life, the first impression is very important for a new manager. Newly appointed managers enjoyed success in their previous careers and would very much like to succeed in the new role of manager. However, things have changed. The dynamics of peer and subordinate interaction have changed. Expectations and one's role within the organization are different. And the way the new manager is perceived has shifted. With that new title, you may no longer be one of the "guys." The challenge is to develop a plan that allows you to make the transition effectively. This is not as easy as it sounds. Managing others is not easy. There is no ready-made template for success once you become a manager. Each situation is different because everyone is unique.

Establish a Plan

Establishing a written plan with milestones throughout the first 100 days on the job is critical for the new manager. Success starts with a plan that maps out where you want to be when the plan is completed. The first step in developing this plan is to analyze the organizational environment to understand the strengths and weaknesses of your personnel. Take the time to learn the employees' roles. Get to know personally the employees in your unit. A manager who takes the time to do these simple things will be more successful in developing a plan for the first 100 days. A number of milestones need to be incorporated within this plan.

Clear Expectations

Subordinates should never be in doubt about the expectations of a new manager. Expectations should be clear and understood throughout the workplace. Expectations allow everyone to know what is important and document where everyone should be headed as an organization. While setting expectations, develop both realistic and challenging expectations for your subordinates to work toward. Many employees seek guidance and challenges. They want to succeed and to know that their contributions are appreciated. Confusion about expectations, roles and goals is detrimental to the group's success and ultimately undermines the manager's ability to lead effectively.

A Communications Plan

Good communication is important in any working environment. Employees want to know the expectations, develop the trust and respect of their peers and managers and receive guidance without going out of their way to find it. Few

situations are more disheartening than wondering whether the manager respects the employee enough to take the time to interact on a personal level. Employees want to know what is going on within their working environment and to maintain a certain level of situational awareness.

Establishing a communications plan that works for the environment accomplishes these important aspects of good communication. The challenge for the new personnel manager is to determine what works best. In some organizations, routine face-to-face meetings work. In other organizations, formal meetings are avoided at all costs. Emails have become the de facto method to communicating in many organizations. If that is the case, ensure that the face-to-face communication does not disappear altogether. It also is important to note that some employees need more attention and guidance than others. The time spent to develop relationships with employees plays a critical role in identifying their needs.

In addition to establishing a method to communicate with the employees, it is essential to encourage feedback and provide a method for it. Employee feedback is essential if a manager is to understand what works and what does not. Feedback also is a key tenet in soliciting ideas for improvement. The single greatest complaint from an overwhelming number of employees is that management does not take their feedback and ideas seriously.

Individual Development Plans (IDP)

An Individual Development Plan (IDP) plays a critical role in an employee's career. Therefore, every employee should have one. The IDP formally documents a plan to improve an employee professionally, and in many cases personally as well. It encourages employees to seek and attain goals and accomplishments that they might not achieve otherwise. The IDP may document the path to a college degree or identify formal certifications that will increase the employee's value and productivity for the organization. The IDP also shows the employee that the manager is interested in his or her professional development and achievement of the stated goals.

The IDP helps the manager evaluate the employee, identifying areas where improvement is needed and providing a tool for documenting an employee's progress and development. IDPs truly are tools that benefit the employee as well as the manager. The time and effort taken in developing these plans are well worthwhile. In addition, the process of developing an IDP for each employee enables a manager to get to know the employee personally and professionally.

A Training Plan

Once IDPs have been developed for each subordinate, the next step for the manager is to develop and establish a formal training plan. This plan may include formal training from professional vendors as well as impromptu or on-the-job training lessons. The key aspect is to ensure that the schedule of training lessons is tailored for the benefit of the employees.

Subordinates should never be in doubt about the expectations of a new manager. Expectations should be clear and understood throughout the workplace.

The training plan should focus on the knowledge, skills and abilities needed to do the respective job more effectively. For example, a project management office may provide training that focuses on project management, possibly resulting in a professional certification for the employee.

An effective method for developing training topics and presentations involves assigning training topics to subordinates and tasking them to develop and provide the training. The employees learn in a collaborative environment, gain a sense of accomplishment and play significant roles in improving the effectiveness of the group. Employees also develop presentation and training skills that will benefit them throughout their careers.

A Recognition Program

Employees want to be recognized for their contributions to the organization. The systematic failure to recognize employee efforts inevitably will lead to resentment and disillusionment. These feelings, if unmitigated, eventually will create a counterproductive workplace. Unfortunately, it only takes one or two individuals who feel this way to create a negative impact on the workplace.

Therefore, if a formal recognition program is in place, use it. If such a program is not in place, establish one, even if it is only within the immediate workplace. Such a program reinforces the employees' sense of worth, establishes relationships and develops an atmosphere of trust and respect.

Develop Professionally

It is important to spend some time during the first 100 days to develop yourself professionally. Many new managers lack

proficiency in managerial tasks such as personnel evaluations or strategic planning. Identify an area that you need to work on and take steps to develop the necessary knowledge, skill or ability to become better. In doing so, you exhibit the willingness to lead by example. If you expect your subordinates to actively develop as professionals, it helps to show a willingness to develop yourself professionally.

Avoid Pitfalls

Avoid the common pitfalls of the first-time manager. Common pitfalls include making significant changes too quickly, not getting to know the employees and not understanding the workplace environment. An additional pitfall many fall into involves failing to understand and use the right methods to praise and criticize.

First, take the time to understand the workplace and the organizational culture before making changes. All organizations are different. The organizational culture is a reflection of the personal characteristics of all the employees, as well as the dominant influences within the workplace. A new manager's plan must take this into account during the first 100 days.

It is important to know the right time to bring new ideas and processes into the workplace. New managers have a better sense of this when they take the time to interact with the employees. Ensure that the interaction is not a one-way street. Share your ideas and experiences openly and when asked to do so. Subordinates want to get to know you as well.

It also is important to remember to praise in public and criticize in private. It seems to be a common practice for new managers to praise privately and criticize publicly, which can destroy credibility, erode trust and divide the workplace. Every minute spent interacting with subordinates provides feedback that allows you to be successful during the first 100 days.

Conclusion

At the end of the 100th day, take the time to conduct an honest evaluation of how well you did in your plan. Determine whether you established the initiatives that you set out to establish and whether you have taken the right steps to improve workplace effectiveness. Once the self-evaluation is complete, understand that the work is only beginning. Take steps to expand your management plan and actively work toward new goals and milestones. The demands of the manager are never-ending. Employees look to their managers for constant guidance and support. The environment is ever changing and requires diligence and proactive management and leadership to evolve and grow. Responsible management plays a critical role in an organization's success. Employees need the trust and support of their managers. What is more important, they deserve the trust and support of their managers.

The author can be reached at cookm49@hotmail.com.

Acquisition Pros Keep the Gears Moving

Janice Laurenti



The Department of Defense (DoD) has been working diligently to replenish its workforce, including the acquisition workforce that was drastically reduced to approximately 147,000 in 1998. Problems resulting from the downsizing quickly began to surface. The DoD realized it did not include the crucial data about the number of soon-to-retire employees in the total workforce reduction. The cutback therefore turned out greater than had been estimated.

Poor planning and the use of incomplete data and analytics were documented as causes for the failure. The decision to downsize later was found to have failed to increase efficiency. But there is light at the end of the tunnel.

Today's up-and-coming acquisition professionals have an opportunity to make a difference in their chosen endeavors—to contribute ideas and synergy to the big picture we call acquisition reform. Federal acquisition is not a one-size-fits-all endeavor. This is not a boilerplate profession. There are several types of acquisitions with just as many if not more acquisition processes, regulatory statutes and policy guides to learn and understand. The most valuable asset the federal government lost from downsizing was its intangible asset—the years of experience and

Laurenti is a contract specialist at the Air Force Training Center Directorate of Contracting at Edwards Air Force Base in California. She works in operational contracting, supporting the 412th Communications Squadron and the 412th Medical Group.



the diverse knowledge of the seasoned workforce that we failed to capture or retain for the next generation of acquisition professionals.

Do More With Less

Adding salt to the wound, the unthinkable happened: the terrorist attacks on Sept. 11, 2001. We found ourselves in a time of increased military spending supporting the deployed troops and the war on terror. The imbalance of the acquisition demands far exceeded available workforce knowledge and skills. The supply was low; the demand high. Civil service employees who remained to man the workforce had to learn to do more with less but lacked the necessary experience, confidence and guidance. No one was prepared for the massive downsizing, and no one had any foresight into the sudden acquisition demands.

Downsizing the federal workforce was the means of achieving efficiency. That was the plan. However, DoD

sorely missed its mark. Ironically, the reasons stated for the failure—poor planning and use of incomplete data—are the same factors DoD blames today for its failed acquisition executions. Doesn't that tell us something?

And the increased supply and service acquisitions supporting the military were more complex for the inexperienced workforce. Timely execution of acquisitions was jeopardized greatly. DoD began outsourcing to contractors to fill the gap.

Although the federal government has made great strides toward increasing the acquisition workforce, acquisition leadership continues to focus on the objective of acquisition reform—identifying areas of deficiency and establishing initiatives for their correction. The reform has included promoting the Copper Cap and Pathways internships embedded within the programs, as well as mentoring and career development initiatives. The reform also includes identifying additional DoD-wide areas of training for the acquisition workforce.

Three Critical Components

Acquisitions are as diverse as the specialists who work them. Remember when I said you can make a difference in this career field? It all begins here. An acquisition professional is considered a high commodity, especially in the federal civil service. Good ones are rare and are hard to find. Ask any of the DoD's contractors; they usually are quick to grab a retired military Service member with acquisition experience. Today's new entrants are trained to be outstanding acquisition professionals and do great things. Getting there requires a lot of work and dedication on the individual's part in professional developing and growth. The key components to becoming a well-rounded acquisition professional are personal qualities, knowledge and development of the skills and competencies to do the job well.

Personal Qualities: The acquisition field is a demanding field and can be both very challenging and very rewarding. This field is not for the timid or for those who are quick to surrender. Acquisition professionals must conduct themselves according to a moral and ethical code. This job can be very stressful. Members of this career field must be secure in their positions and in doing the right things ... always, even under pressure and with their viewpoints challenged. They must be confident and remain true to their integrity and moral compasses.

Integrity can never be negotiated.

Unbiased Liaison: The acquisition objective is to support the warfighter. However, contractors have a different goal: to earn a profit. The acquisition professional is the intermediary and should be fair and impartial toward all concerned parties to achieve a result in which

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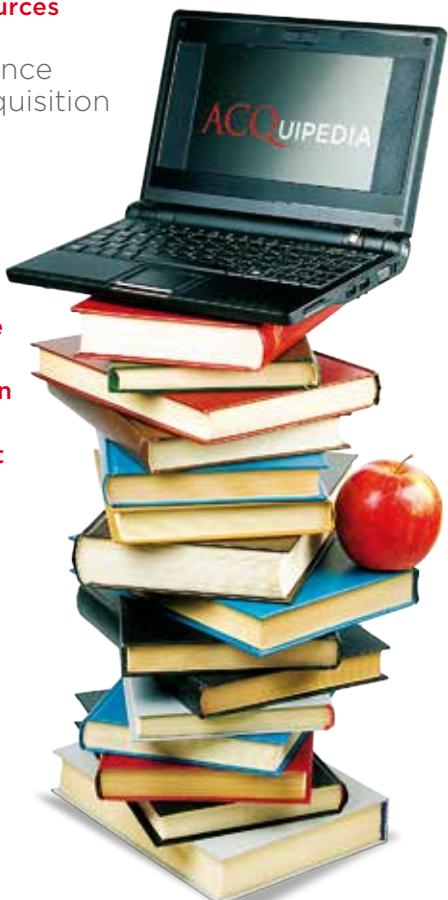
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both sides win. Although the acquisition professional is a civil service employee, it does not mean the government is always right and the contractor is always at fault. There are times when the acquisition professional will be the referee who will send the government and the contractor to their respective corners.

The Inquisitive Nature: Another fine quality for an acquisition professional is to be curious, to take the initiative to investigate what he or she doesn't know, to learn and to become better informed. The more informed you are about the subject matter, any subject matter, the better your position will be to provide sound logical business advice to the customer and leadership. It is human nature to sometimes have tunnel vision—seeing things from just one perspective. The acquisition professional must see things holistically, from all points of view.

Developing Knowledge and Skills

There are many moving parts in an acquisition program and this ultimately can prove quite overwhelming for some workforce members. At times, you will feel pulled in every direction. Fear of failure will begin to set in, reducing your confidence in your own ability to do the job. Trust me. I know. I've been there. I have worked acquisitions in both the public and private sectors. Both demand that the individual accept the experience with tenacity and an appetite for a challenge. The career field can be very perplexing; hence, the importance of the personal qualities previously mentioned. The technical how-to knowledge and skills will be learned over time.

The acquisition profession also is very rewarding—program folks, subject-matter experts (SMEs) and military leaders working together to support the mission and the warfighter. I cannot emphasize enough the importance of promoting a synergistic and collaborative effort with your program folks and team members throughout the entire acquisition process.

Acquisition Reform

Part of acquisition reform includes resupplying the acquisition workforce with new hires. Funding for the new workforce comes from various sources. The Copper Cap and Pathways internships are popular acquisition workforce programs. Increasing the workforce and revising the training sources are focuses throughout the acquisitions communities.

The Copper Cap and Pathways programs are embedded with detailed training and mentoring, including mandatory rotations throughout the life of a program until the candidate graduates from that program. Others who enter the acquisition workforce arrive under different circumstances and funding sources. I came into the civil service under a Direct Hire Authority and did not know at the time that this meant my position was temporary. I was what is called, in an imperfect system, an "over hire." Fortunately, I ultimately was given a permanent slot, but I was surprised to learn that participants in the intern program are "groomed" and "mentored" while

other types of employees did not have access to that kind of career development.

Let us not be part of the problem but rather part of the solution. As flawed as the system seems to be, how the workforce gets here isn't important. What matters is, now that the workforce is here, what is it going to do? How will it make a difference?

Acquisition is a demanding field and sometimes tests one's integrity and character. Acquisition is not solely transactional: There is more involved than paperwork and peer reviews. Acquisition is about being cognizant of all the moving parts: What is the program manager (PM) doing? What is the contractor doing? What are the provisions of the Federal

all, they are the conduits to the warfighter. What better way could there be to serve the customers than to meet with them, one on one and as often as possible, to keep open the lines of communication? Early involvement and open dialogue with the customer and other members of the acquisition team increase the chances for an execution success because the working unit is made cohesive through this direct contact. The more informed the acquisition professional is with the requirement, the better able he or she will be to provide sound logical business advice to the customer.

Today's acquisition professionals need to be proactive and inquisitive, to be eager to learn and to be informed—to become as invested in the acquisition as the PMs who write the



Today's up-and-coming acquisition professionals have an opportunity to make a difference in their chosen endeavors—to contribute ideas and synergy to the big picture we call acquisition reform.

Acquisition Regulation or the Defense Federal Acquisition Regulation Supplement? You need not know how to do everyone's job but you do need to know that everyone is doing his job.

Acquisition is about reading. There is a great deal of information, and many individuals publish and share their experiences and knowledge. Take advantage of the information now instantly available through today's technology. When workforce members left in the 1990s, so did all their knowledge and experiences. Today we have this information at our fingertips. It is only a computer click away. Be proactive and learn more than just what is required. The career field of acquisitions is multifaceted. It is not one dimensional as some might think. It never is satisfactory to simply say, "I don't have to know that because that is not my job." Become informed—knowledge and information are sources of power.

Know the Requirement

The key is to know and understand the acquisition. What is the purpose of the acquisition? Who are the stakeholders? To answer these and many other questions that will surface throughout the acquisition's process, it is recommended that the acquisition professional meet early and as often as necessary with the PM. Be engaged with the PM and the requirement. Acquisition requires us to be critical thinkers (remember to be inquisitive) and to be self-motivated professionals.

All customers want to feel they are most important customers. In my book, they all are of the greatest importance. After

Statement of Work or Performance Work Statement. That support starts by becoming as informed as possible with the specifics of the requirement, the needs of the customer and the risks involved.

Acquisition is a team effort. The team needs members who contribute as the SMEs for the requirement. Program management, contracting, legal and policy all have important roles in ensuring that the data used for decision making are complete and accurate. Therefore, it is important to develop rapport with the PM early in the planning stage, working collaboratively toward execution.

Lessons Learned

If we were to take anything away from the 1990s downsizing, it would be the erroneous presumption that only the workforce members were removed. In fact, it was the failure to capture the knowledge, experiences and the diverse perspectives of the workforce that exacerbated the situation. The government should have taken advantage of its human capital and collaborated with those who have seen the worst of the worst and the best of the best—our seasoned and experienced workforce. Lessons learned? Acquisitions do not get executed on assumptions. We need the workforce to become informed, learn the business of acquisitions and take the initiative to gain as much knowledgeable as possible. Become the SME for every acquisition you put your name on.

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The author can be contacted at janice.laurenti@us.af.mil.



Best Value Strategy

Raising Special Ops Mobility

Nathan Meidl

Three years ago, the Special Operations Forces (SOF) identified a shortfall in ground mobility that denied access to austere terrain. In response, United States Special Operations Command (USSOCOM) pursued the acquisition of a unique vehicle to address this capability gap. The culling and clarification of requirements, combined with a unique source selection approach, allowed USSOCOM to compress acquisition cycle time and expedite the acquisition of Ground Mobility Vehicle 1.1.

Upon identification of the capability gap, USSOCOM convened a requirements working group which rapidly crafted the Capabilities Production Document (CPD) for a SOF-unique Ground Mobility Vehicle (GMV) 1.1 tactical ground vehicle. The Key Performance Parameters (KPPs) included internal air transport in a CH-47 rotorcraft, tractive effort to climb a 60 percent grade, rollover protection for the crew, net ready, and operational availability of 95 percent. Modular in design, this vehicle has the operational flexibility to support a wide range of lethal and non-lethal Special Operations missions and core activities. USSOCOM approved the CPD and established a procurement ceiling of 1,297 trucks to replace the existing HMMWVs (High Mobility Multipurpose Wheeled Vehicles) used by SOF, and

Meidl is a career program management professional with experience executing U.S. Army and U.S. Special Operations Command (USSOCOM) vehicle programs from inception through sustainment. This experience is based both on Acquisition Category (ACAT) ID programs for the Army and ACAT-III program for USSOCOM. He serves in Tampa, Florida, as an acquisition program manager within USSOCOM's Program Executive Office, Special Operations Forces Warrior, as the lead for the Ground Mobility Vehicle (GMV1.1). The author wishes to thank Lt. Col. James Utsler and Duke Dunnigan, the program manager and deputy program manager, respectively, for the Family of Special Operations Vehicles, for contributing to and reviewing the content of this article.



Above: A GMV1.1 conducts a Special Operations Forces user jury test for mobility.

Right: A GMV1.1 conducting Weapon integration and live fire testing.
USSOCOM Photos

to allow infiltration and exfiltration from previously denied austere terrain.

Once the requirement for the GMV1.1 was approved, the Special Operations Research, Development, and Acquisition Center (SORDAC) tasked its program executive officer for SOF Warrior to assign acquisition management responsibility to the program manager for the Family of Special Operations Vehicles (PM-FOSOV). PM-FOSOV immediately set out to assess industry's ability to meet an aggressive acquisition schedule by releasing a Federal Business Opportunities (FEDBIZOPPS) sources sought and questionnaire. In addition, the PM-FOSOV team conducted two industry conferences to convey the requirement to U.S. and international vehicle manufacturers and ascertain the technology readiness of existing solutions. The net result led SORDAC to conclude that nearly 10 vendors had material solutions to achieve the GMV1.1 requirement. Without the need to develop and mature the underlying technologies, SORDAC pursued a best-value acquisition strategy to make the necessary trade-offs between technical capability, cost, and past performance to choose the best platform for SOF operators.

Armed with the users' daunting requirement for a highly mobile vehicle capable of carrying a crushing payload, US-

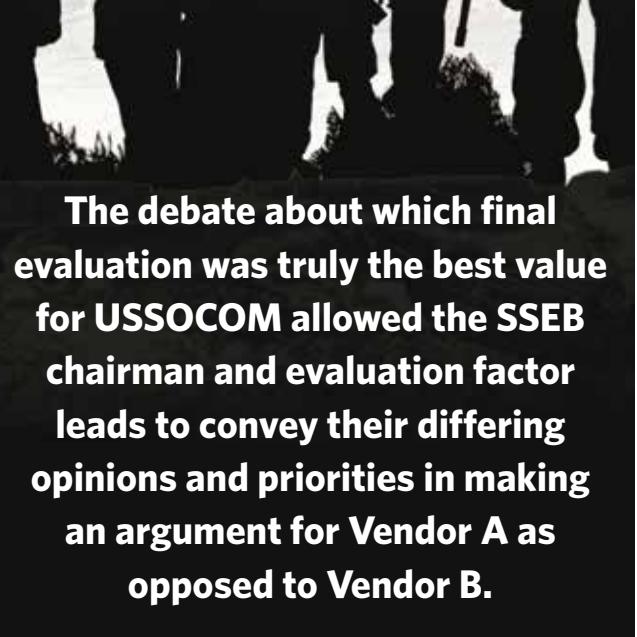


SOCOM used the published sources sought and industry-day events to convey the urgency of the requirement and articulate what best value meant for SOF. The technical priorities, coupled with a short acquisition schedule, demonstrated the need for a nondevelopmental item (NDI) instead of a build-to-specification vehicle. With that point hammered home, PM-FOSOV conveyed the importance of mature producibility of the vehicle. The timeline and need to deliver a mature NDI, build-sample-test product forced some potential vendors to make the tough decision to back away from the GMV1.1 competition, because their solutions were not anywhere near the required technology readiness level (TRL), and they had no existing production line. Put simply, their trucks were still in development.

Given tight time constraints, USSOCOM took an aggressive and innovative approach to build a diverse team of the most experienced program management, engineering, logistics, legal, contracts and operator professionals from component commands to streamline the initial bid-sample source selection. The team took nearly 600 performance specifications from the capability sponsor and reduced them to the top 30 critical requirements to drive source-selection planning. This allowed the team to shift the focus to those specifications related to the KPPs and to evaluate more mature vendor solutions. The intent was to acquire a “best value” solution for the SOF operator while meeting an aggressive procurement schedule within the program’s appropriated budget. For those performance attributes deemed unaffordable or technically immature at the program’s initiation, the FOSOV team prioritized and built a funding profile to address these as future Pre-Planned Product Improvements (P3I) throughout the life cycle of the vehicle. This strategy resulted in a Better Buying Power (BBP) technique in the areas of control costs and achieve affordable programs, demonstrating SOF compliance with the Department of Defense (DoD) initiative.

In order to validate that KPP-focused source selection criteria and relative weighting of the evaluation factors would allow for a true best-value decision, the USSOCOM team deliberately wargamed the source-selection plan. The team started by using market research data from industry conferences and inserting the various capabilities and shortfalls into mock proposals. To better test the process, they ensured that proposals represented every combination of tech versus cost versus past performance. Once mock proposals were completed, the integrated product team brought the entire Source Selection Evaluation Board (SSEB) to USSOCOM in Tampa, Florida, and conducted in-depth training sponsored by contracting and legal personnel. The training familiarized the evaluators with all the required forms, parameters and limitations of the information that can be evaluated.

Armed with the source-selection plan, training and the evaluation forms, the board was provided with the mock vendor proposals and asked to perform the arduous task of rating and rolling up evaluations. What surprised evaluators in the source-selection wargame was the difficulty in discerning between a weakness versus a significant weakness, and compliance versus strength. The exercise forced the evaluators to return repeatedly to the definitions of weakness and significant weakness, making the process second nature before the team progressed to the actual source selection. This unique source selection training proved to be an invaluable schedule saver for the SSEB. Furthermore, the debate about which final evaluation was truly the best value for USSOCOM allowed the SSEB chairman and evaluation factor leads to convey their differing opinions and priorities in making an argument for Vendor A as opposed to Vendor B. This exercise was critical both in giving the team confidence that the request for proposal (RFP) was structured properly to allow sufficient evaluation of proposals to determine a best-value decision and, what was equally



The debate about which final evaluation was truly the best value for USSOCOM allowed the SSEB chairman and evaluation factor leads to convey their differing opinions and priorities in making an argument for Vendor A as opposed to Vendor B.

important, ensured all evaluators shared a common definition of best value. As always, the more realistic the training, the greater the value to the mission.

The wargame tested the Source Selection Evaluation Plan and drove the strategy to require a bid sample truck from each vendor. This provided industry with an opportunity to demonstrate its vehicle’s technical maturity and ability to meet stated KPPs. Bid sample testing entailed focused evaluation of dimensions for internal air transport, horsepower/tractive effort, and human factors involving space for personal gear and payload. The RFP was released for full and open competition on FEDBI-ZOPPS. Based on a Best Value decision, USSOCOM awarded a seven-year indefinite delivery/indefinite quantity contract to General Dynamics Ordnance and Tactical Systems).

The magnitude of the \$562 million GMV1.1 contract, combined with the current shrinking DoD budget for tactical wheeled mobility, made for fierce competition. As is often the case, several unsuccessful offerors challenged the government’s decision. The wargame exercise proved extremely beneficial as it sharpened the source-selection team and kept it focused on following a well-defined source selection plan. In every case, the government’s award decision was upheld. Much of the credit goes to the rigorous wargaming process the source-selection team followed.

In the case of GMV1.1, the keys to success were clearly understanding the marketplace, managing and stratifying requirements in affordable increments, building a solid source-selection team, wargaming the source-selection plan and involving users early in the process. The team achieved BBP principles by building an affordable vehicle on an aggressive schedule with as much of the performance as was affordable within its requirements. The BBP principles were a natural extension of the team’s efforts to get maximum return for our taxpayer dollars.

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The author can be contacted at nathan.meidl@socom.mil.



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Software 2015: Situation Dire

Don O'Neill

The increasing dependence of industry and government on an immature software profession whose promise exceeds its delivery has become a source of risk that teeters at the tipping point. The convergence of software, national security and global competitiveness interactions and their fragile dependencies could unleash a destructive synergy of propagating and cascading effects. All this is happening while both industry and government continue as free-rider software users who lack both the ability and will to act.

The Software 2015: A National Software Strategy to Ensure U.S. Security and Competitiveness—issued by the Center for National Software Studies in May 2005—observed that software is the critical infrastructure within the critical infrastructure, the theme of the Second National Software Summit (NSS2, 2005). The 2015 Software Vision was then stated as: “Achieving the ability to routinely develop trustworthy software products and systems, while ensuring the continued competitiveness of the U.S. Software industry.” The question today is: Where do we stand with respect to the National Software Strategy and its programs? The answer is that the situation is dire.

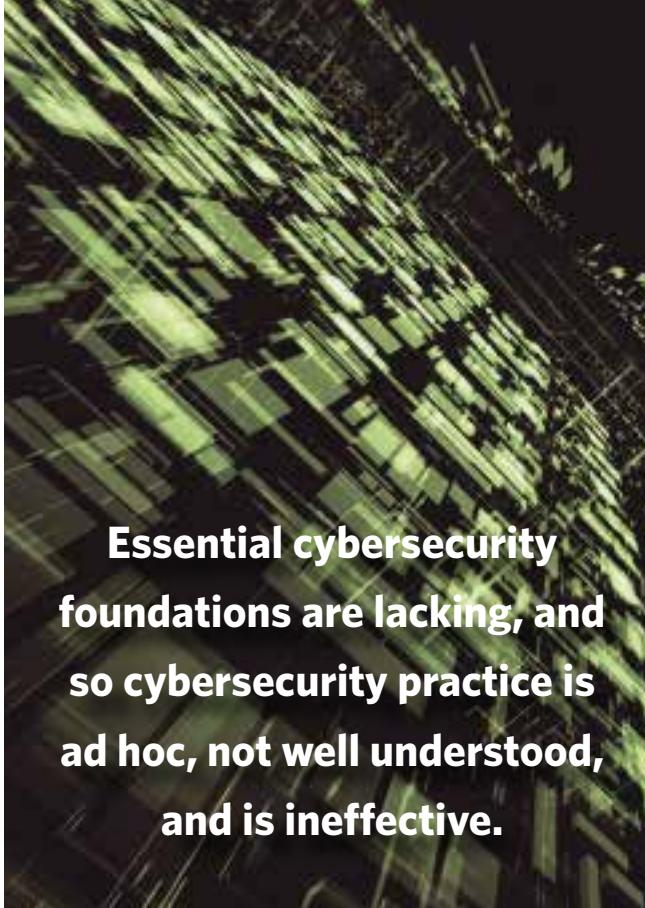
Outcomes

The situation is dire in terms of National Software Strategy (NSS2, 2005) outcomes. Industry and government continue to increase dependence on software produced by an immature profession that has stumbled in delivering trustworthy software components, systems, and systems of systems to the nation’s critical infrastructure and defense industrial base. This results in cybersecurity weaknesses and vulnerabilities that are exploited at will by persistent adversaries whose capabilities and motivation can only be surmised by assessing their consequences. A cybersecurity shortfall threatens competitiveness

O'Neill was president of the Center for National Software Studies (CNSS) from 2005 to 2008. Following his 27-year career with IBM's Federal Systems Division (FSD), he completed a three-year residency at Carnegie Mellon University's Software Engineering Institute (SEI) under IBM's Technical Academic Career Program and has served as an SEI Visiting Scientist.







Essential cybersecurity foundations are lacking, and so cybersecurity practice is ad hoc, not well understood, and is ineffective.

by easy and continuing loss of intellectual capital to nation-states that drive on an information highway without rules or consequences.

Essential cybersecurity foundations are lacking, and so cybersecurity practice is ad hoc, not well understood, and is ineffective. Premature cybersecurity training and certification programs do not yield the capability to secure large-scale software-intensive systems, research programs are misdirected, Science, Technology, Engineering and Mathematics (STEM) initiatives promise what they cannot deliver, and executives and senior managers are disconnected from the realities they face. The increasing dependence on software to boost productivity and achieve competitiveness is not being met with increasing domestic workforce capability and capacity. Instead, enterprises in search of value continue to choose offshore outsourcing for skills and cheap labor despite vigorous political attempts to stigmatize this practice.

Citizen concerns about privacy, civil liberties and liability are obstacles to effective information sharing, and thereby erect barriers to achieving cybersecurity. While government dangles tax incentives, investment credits and insurance as incentives to purchase the full-throated cooperation of industry in information sharing, industry awaits a

government offer of indemnification to unlock the stalemate and lubricate the risk calculations of critical infrastructure industry executives.

The nation's austerity and affordability challenges tied our hands just when the starter's gun signaled the beginning of the 21st century. On top of all this, the will to act is lacking due to a national leadership crisis.

Competitiveness

The most basic attribute of competitiveness is the sustainability of workers' wages. The Council on Competitiveness further states that competitiveness is the ability of U.S. products and services to meet the test of international markets while sustaining or boosting the wages of the workers who produce them.

Stages of competitiveness are organized around the activities associated with supplier control, customer control, competitor control, and event threat control. See Figure 1. Supplier control is achieved by establishing an attractive workplace culture, achieving maturity in process and skills, deepening industry relationships, and retaining personnel. The art of customer control is achieved by deepening customer relationships, balancing business factors, and achieving total customer satisfaction. Competition is controlled by deepening community relationships, fielding superior products, and setting the direction for the niche. Event threats and change are controlled by guarding against government intrusion, applying strategic software management, performing due diligence and understanding reality.

Numerous issues threaten competitiveness. The increasing dependence on software to achieve competitiveness is not being met with increasing domestic workforce capability and capacity. Enterprises in search of value continue to choose offshore outsourcing for skills and cheap labor. Cybersecurity shortfall threatens continued loss of intellectual capital. Tax policy, misguided regulations and antitrust litigation offer impediments and uncertainty. The austerity and affordability challenge ties our hands from the start. The Department of Defense (DoD), the defense industrial base, and the nation's critical infrastructure all face challenges in supply-chain risk

Figure 1. Competitiveness

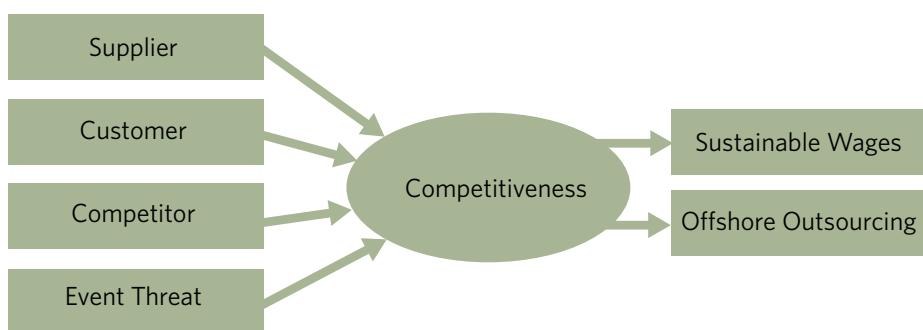


Figure 2. Security

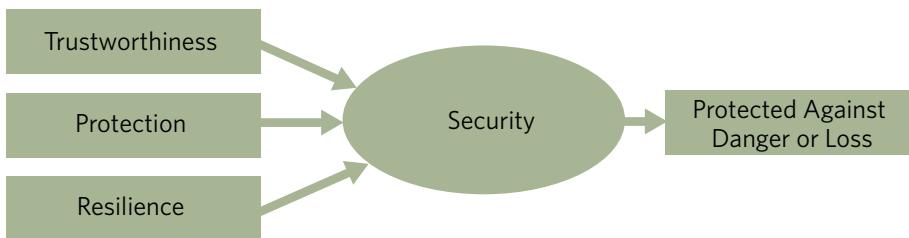


Figure 3. Software



management. These diverse challenges span infrastructure, trust, competitiveness and austerity. Beginning with acquisition, where supply chain foundations are laid, software and supply-chain risk management (SSCRM) assurance extends into operations and sustainment.

Security

The most essential attributes of security are trustworthiness, protection and resilience. See Figure 2. Security is defined as being protected against danger or loss. Software assurance is the level of confidence that software is free from vulnerabilities. It involves trustworthiness and no exploitable vulnerability, justifiable confidence in predictable execution, and conformance through planned and systematic multidisciplinary activities.

Simply put, the goal of cybersecurity is to assure the trustworthiness, security and resiliency of software components, systems and systems of systems of all kinds, including those used in national defense and the nation's critical infrastructure. Resilience is the ability to anticipate, avoid, withstand, mitigate and recover from the effects of adversity, whether natural or man made, under all circumstances of use.

Many issues surround security. Cybersecurity foundations are lacking. Cybersecurity practice is ad hoc and not well understood. Ineffective cybersecurity training and certification programs do not provide an ability to secure large-scale software-intensive systems. Research programs often are misdirected and promise what they cannot deliver. As mentioned above,

STEM initiatives cannot deliver the needed results and executives and senior managers are disconnected from the realities they face. Privacy, civil liberties, and concerns about information sharing liability increase resistance and barriers to achieving cybersecurity.

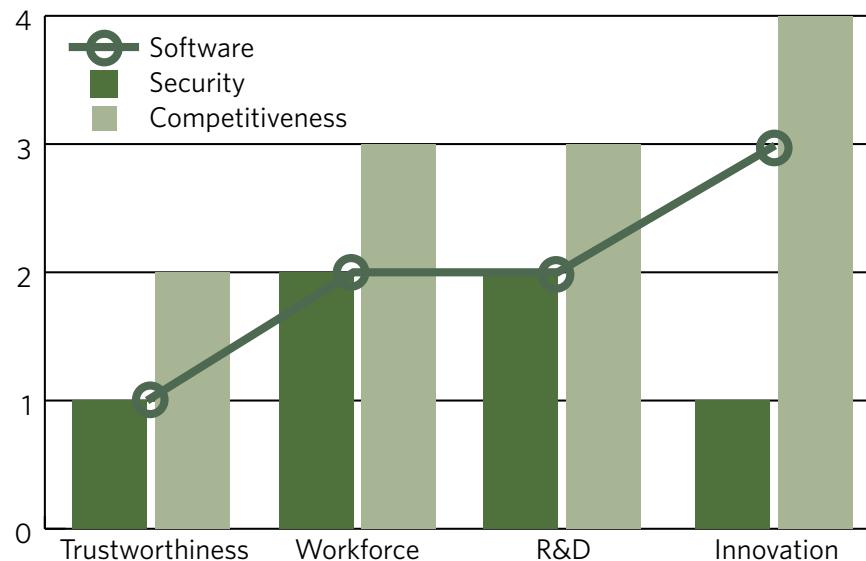
Software

The most valued attribute of software is trustworthiness, and this is achieved through good software engineering and the willingness to manage technical debt. See Figure 3. A trustworthy software system is engineered to rigorously demonstrate completeness, correctness, style, rules of construction, and multiple views in order to be trustworthy, secure and resilient. The body

of knowledge for good software engineering spans iterative development, systematic design and programming, rigorous software inspections and software process maturity.

The issues surrounding trustworthiness are deeply rooted. An immature software profession continues to stumble in delivering trustworthy software components, systems, and systems of systems. Delivered software continues to contain weaknesses and vulnerabilities that can be exploited. There is growing software dependence in the nation's critical infrastructure and defense industrial base, both of which depend on assuring trustworthiness. Next-generation strategies and tactics do not build on earlier work, lessons learned and past achievements. Academia is not connected to the needs of entry-level practitioners. The profession of software engineering continues to

Figure 4. National Software Strategy Program Assessment



be stigmatized. Corporations seek to commoditize software engineering and programming by outsourcing them. Not yet managed, technical debt is growing nonlinearly.

National Software Strategy Programs

The state of the National Software Strategy Programs is shown in Table 1 with respect to software, security and competitiveness. These programs focus on improving software trustworthiness, educating and fielding the software workforce, re-energizing software research and development (R&D), and encouraging innovation within the U.S. software industry.

In assessing the current state of progress in the National Software Strategy Programs, the following observations are offered. Lack of improvement in software trustworthiness may restrain security but not competitiveness, due to a shortfall in trustworthiness practice and a shortfall in cybersecurity foundations and practice. Limited improvement in educating and fielding the domestic software workforce may restrain security as STEM promise exceeds delivery, but not competitiveness, as this weakness may serve to

stimulate offshore outsourcing. Limited software research and development may restrain security with corporate decreases in R&D spending, DoD withdrawal of support for Carnegie Mellon University's Capability Maturity Model Integration (CMMI), and the threat of sequestration looming over the defense industrial base; but competitiveness will not be restrained. Moderate improvement in encouraging innovation within the U.S. software industry may serve to boost competitiveness with "innovation in the small" in evidence, while impacting security because mobile and Bring Your Own Device (BYOD) offer new challenges to cybersecurity. In summary, software practice continues on the one hand to be a challenge revealing itself most evidently as an enabler to the nation's cybersecurity threat; on the other hand, software houses much of the innovation that underlies U.S. global competitiveness. See Figure 4.

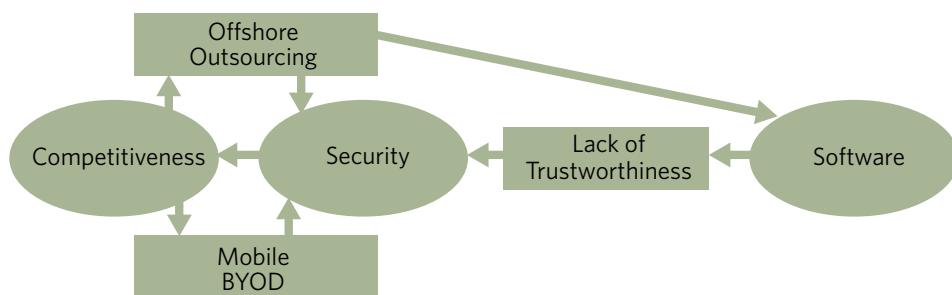
Next-Generation Software Engineering

In accordance with current austerity, the immediate goal of practical next-generation software engineering is to drive systems and software engineering to do more with less ... fast.

Table 1. Status of National Software Strategy Programs

National Software Strategy Programs	Software	Security	Competitiveness
Improving software trustworthiness	<ul style="list-style-type: none"> ▪ Software trustworthiness foundations known ▪ Shortfall in software trustworthiness practice ▪ Increasing acceptance of technical debt 	<ul style="list-style-type: none"> ▪ Cybersecurity foundations not fully known ▪ Shortfall in cybersecurity practice ▪ Strong focus on software security assurance through Department of Homeland Security/DoD Software Assurance Forums and Working Groups 	<ul style="list-style-type: none"> ▪ Shortfall in software trustworthiness and cybersecurity practice threaten U.S. competitiveness ▪ Strong market in cybersecurity as organizations seek to find perimeter defense and secure in-depth protection
Educating and fielding the software workforce	<ul style="list-style-type: none"> ▪ Science, Technology, Engineering and Mathematics (STEM) promise exceeds delivery ▪ Domestic software workforce shortfall serves to stimulate offshore outsourcing 	<ul style="list-style-type: none"> ▪ STEM promise exceeds delivery ▪ Shortfall in cybersecurity workforce 	<ul style="list-style-type: none"> ▪ STEM promise exceeds delivery ▪ U.S. competitiveness dependent on offshore outsourcing
Re-energizing software research and development (R&D)	<ul style="list-style-type: none"> ▪ Corporate decrease in software R&D spending ▪ DoD withdrawal of support for Capability Maturity Model Integration (CMMI) ▪ Sequestration impact looms over defense industrial base 	<ul style="list-style-type: none"> ▪ Continued focus on Critical Infrastructure Protection (CIP) ▪ Inadequate focus on Critical Infrastructure Resilience (CIR) 	<ul style="list-style-type: none"> ▪ Defense industrial base resistance to fixed price contracting
Encouraging innovation within the U.S. software industry	<ul style="list-style-type: none"> ▪ "Innovation in the small" in evidence ▪ Team innovation management needs improvement 	<ul style="list-style-type: none"> ▪ Defense industrial base focus on CIP not CIR ▪ Mobile and Bring Your Own Device (BYOD) offer new challenges to cybersecurity 	<ul style="list-style-type: none"> ▪ Strong commercial industry product focus on innovation ▪ Defense industrial base examples—i.e., Lockheed Martin Corporation's Innovate for the Future Initiative

Figure 5. Primary Competitiveness, Software, Security Interactions



Four practical objectives are identified to advance this goal using smart, trusted technologies:

- Drive user domain awareness.
- Simplify and produce systems and software using a shortened development life cycle.
- Compose and field trustworthy applications and systems from parts.
- Compose and operate resilient systems of systems from systems.

Wrap-up

Recognize that competitiveness is like floodwater finding or creating its own path. Competitiveness impacts both software and security as it favors offshore outsourcing and further

impacts security as innovation drives toward mobile and BYOD. Recognize also that software and security are connected at the hip through the elusive attribute of trustworthiness and together impact competitiveness in a not-so-virtuous cycle of interactions. See Figure 5.

The software situation is dire because we are short on competitiveness, innovation and STEM resources; we are long

on offshore outsourcing and technical debt; we are short on trustworthiness and cybersecurity; we are uncommitted to fixed price contracting; and we underutilize next generation software engineering and undervalue the CMMI. The journey no longer has a destination. Fueled by austerity and neglect, trustworthiness, workforce and R&D are in a heightened technical debt. Driven by genuine market forces, innovation and competitiveness are finding their own paths.

If the software industry is to be consequential going forward, it can't just settle for governance and compliance. Instead it needs to be smart and trusted, and it needs to break things ... starting with old habits. &

The author can be contacted at oneilldon@aol.com.

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Defense AT&L

Writers' Guidelines in Brief

Purpose

Defense AT&L is a bimonthly magazine published by DAU Press, Defense Acquisition University, for senior military personnel, civilians, defense contractors, and defense industry professionals in program management and the acquisition, technology, and logistics workforce.

Submission Procedures

Submit articles by e-mail to datl@dau.mil. Submissions must include each author's name, mailing address, office phone number, e-mail address, and brief biographical statement. Each must also be accompanied by a copyright release.

Receipt of your submission will be acknowledged in 5 working days. You will be notified of our publication decision in 2 to 3 weeks. All decisions are final.

Deadlines

Note: If the magazine fills up before the author deadline, submissions are considered for the following issue.

Issue	Author Deadline
January–February	1 October
March–April	1 December
May–June	1 February
July–August	1 April
September–October	1 June
November–December	1 August

Audience

Defense AT&L readers are mainly acquisition professionals serving in career positions covered by the Defense Acquisition Workforce Improvement Act (DAWIA) or industry equivalent.

Style

Defense AT&L prints feature stories focusing on real people and events. The magazine seeks articles that reflect author experiences in and thoughts about acquisition rather than pages of researched information. Articles should discuss the individual's experience with problems and solutions in acquisition, contracting, logistics, or program management, or with emerging trends.

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